BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the Matter of	) Docket No. 14-IEP-1B
	)
2014 Integrated Energy Policy	)
Report Update (2014 IEPR Update)	) Workshop

ALTERNATIVE FINANCING OPTIONS FOR ADVANCED TECHNOLOGY TRANSPORTATION PROJECTS

CALIFORNIA ENERGY COMMISSION
HEARING ROOM A, 1516 NINTH STREET
SACRAMENTO, CALIFORNIA

WEDNESDAY, APRIL 23, 2014
10:00 A.M.

Reported by:
Kent Odell

APPEARANCES

Commissioners Present (*Via WebEx and telephone)

Janea A. Scott, Lead Commissioner for the 2014 IEPR Update
Lead Commissioner on Transportation
Rhetta DeMesa, Her Advisor
Jim Bartridge, Her Advisor

Karen Douglas

CEC Staff Present

Heather Raitt

Presenters

John Butler, Office Manager, Emerging Fuels and Technologies Office, CEC

*David Greene, University of Tennessee

Panel 1

Tyson Eckerle, Governor's Office of Business and Economic Development
*Charles A. Myers, Massachusetts Hydrogen Coalition
*Cisco DeVries, Renewable Funding
Renee Webster-Hawkins, California Pollution Control Financing Authority
John Rhow, Kleiner Perkins

Panel 2

*Sunita Satyapal, U.S. Department of Energy, Fuel Cell Technologies Office, Energy Efficiency and Renewable Energy
Penny McDaniel, U.S. Environmental Protection Agency Region 9, West Coast Collaborative
*Damian Breen, Bay Area Air Quality Management District
Clark Williams, California Department of Resources Recycling and Recovery (CalRecycle)
Andy Panson, California Air Resources Board

Also Present:

Bill Boyce
*Noel Crisostomo
Quentin Foster

I N D E X

I N D E X (Contin.)

P R O C E E D I N G S

APRIL 23, 2014 10:08 a.m.

MS. RAITT: Good morning and welcome to today's IEPR Workshop on Alternative Financing Options for Advanced Technology Transportation Projects. This workshop is part of the 2014 IEPR Update.

I'm Heather Raitt, I am the Lead for the IEPR and I'll begin by going over the usual housekeeping items.

Restrooms are in the atrium, please be aware that the glass doors next to the restrooms are for staff only, and an alarm will sound if you try to exit that way. A snack room is on the second floor at the top of the atrium stairs under the white awning.

If there is an emergency and we need to evacuate the building, please follow staff to Roosevelt Park, which is across the street diagonally from the building, and wait there until it is safe to return.

Today's workshop is being broadcast through our WebEx conferencing system and parties should be aware that they're being recorded. We'll post the audio recording on the Energy

Commission's website in a couple of days and a transcript in about three weeks.

I'll briefly go over the agenda. This morning we'll have opening comments from the Commissioners, and then two speakers will provide a framework for the day. Then we'll have a panel to explore some financial instruments, and then we'll break for an hour at about 12:15.

In the afternoon we have a second panel to discuss opportunities for leveraging funding, and at the end of the day there will be an opportunity for public comments and questions.

The agenda is tight, so we're asking speakers to limit their comments to 10 minutes to allow time for all the presenters. And we ask the public to limit their comments to three minutes during the public comment period.

We'll take comments first from those in the room, followed by people participating by WebEx, and finally by folks participating by phone. Please do fill out a blue card if you'd like to make comments at the Public Comment period and when it's time, come to the center podium and speak into the microphone, and please give the Court Reporter your business card.

For WebEx participants, you can use the chat function to tell our WebEx Coordinator that you want to ask a question or make a comment during the public comment period, and we'll either relay your question or open your line at the appropriate time. And for phone-in participants, we'll open your lines after we've taken comments from the others in the room and on WebEx.

Materials for the meeting are posted at the entrance of the hearing room and also online. We do encourage written comments and request that they be submitted by May 7th, and the process for submitting comments is on the Notice. And with that, I'll turn it over to the Commissioners for opening comments.

COMMISSIONER SCOTT: Thank you, Heather. And good morning, everybody. And welcome to our third workshop for the 2014 Integrated Energy Policy Report Update.

I'm Janea Scott, the Lead Commissioner on Transportation and for the 2014 IEPR Update, and I'm joined on the dais here by my two terrific Advisors, Rhetta DeMesa and Jim Bartridge. And Commissioner Douglas will probably come in and

out periodically throughout the day.

So historically, the Alternative and Renewable Fuel and Vehicle Technology Program has relied primarily on grants as a form of the incentives. And within this program, we've been able to leverage about $2.00 of private funding and investment for every dollars that we've invested.

The AB 118, recently reauthorized by AB 8, gives the Energy Commission the option of using multiple financial instruments. So one of the goals of today's workshop is to explore some of those other possible funding mechanisms that AB 8 mentions, like revolving loans, loan guarantees, loans, vouchers, rebates, and other appropriate funding measures. These mechanisms may also help support ongoing development and deployment of the projects, the Alternative and Renewable Fuel and Vehicle Technology Program funds.

The Program makes available up to $100 million per year to support a portfolio of projects to meet the state's energy, environmental and economic goals. This program is consistently oversubscribed, and although $100

million sounds like a lot of money, and it really is, we know that this funding alone is not enough to support the transformation of California's transportation sector.

So another of the goals of today's workshop is to learn more about some of the other funding opportunities from our Federal, State, and local partners, and to think about if there are ways that funding may complement one another.

I think it's important for us to collaborate in the places where it makes the most sense with our Federal, State, and Regional efforts to best leverage public and private dollars, the expertise, the data, and to learn from each other's experiences.

So we're honored to have with us a number of financial experts, as well as other funding entities today. And I'm looking forward to seeing what we can learn from our discussions. And so let us go to our first presentation, which will be from John Butler, who is the Office Manager of the Emerging Fuels and Technologies Office. Welcome, John.

MR. BUTLER: Thank you, Commissioner Scott. My name is John Butler, I'm the Manager

of the Emerging Fuels and Technologies Office, as the office here at the Energy Commission that is primarily responsible for implementation of the Alternative and Renewable Fuel and Vehicle Technology Program, and I'll refer to that as "the Program" from now on because it's a mouthful.

Thank you. I will give you a brief overview on the funding mechanisms that the Program currently uses and has the authority to use and a little bit of what our future thinking and vision is in this area.

So let's start with the authority, so Commissioner Scott did mention our authority in AB 8 and in our statute, but we do have the ability to issue competitive grants, revolving loans, loan guarantees, and loans. And then the one I think we really like is this "other appropriate funding mechanisms." That certainly opens a wide door for us; however, we always have to be careful with that, we need to make sure that we're always operating within the prudent use of State funds and it doesn't give us a carte blanche to do any type of funding mechanism, but we always want to make sure that they're

appropriate to meet the goals of the State of California and the Energy Commission.

So what have we used under the Program? As Commissioner Scott mentioned, we typically use the Competitive Grant awards. We use that because we *are* oversubscribed. And typically we're looking for the best projects to achieve the goals that we're trying to achieve in all the different funding categories we have under the Program. That gives us the ability to have our Applicants come to the table with their proposals, their projects, and we can evaluate those and provide funding to those that will best meet our needs.

We have also run some incentive programs, so the Natural Gas Vehicle Incentive Program, we had a number of those reservations approved at yesterday's Business Meeting. These are typically used when we have a more mature market where we're just trying to deploy the technologies that are out there in the field. We're giving these rebates or incentives, you know, for natural gas vehicles to incentivize those to get those on the road.

We are having discussions internally that

EVSE or Electric Vehicle Charging Infrastructure that may be near the time where we start looking at possibly giving that incentive rather than doing competitive awards. We recently completed a competitive solicitation for electric charging, we've released the Notice of Proposed Awards, and we're in the process of writing those agreements.

But one of the things I know we're kicking around internally is, you know, maybe that is at a stage, a market stage, where we can start providing incentives or rebates and try to streamline some of the administrative burden of administering these funds.

Last but not least, we do from time to time issue exempt contracts with public agencies. We actually try to minimize the use of that, but there are opportunities, unique opportunities that come up from time to time where contracting directly with a public agency, and the obvious one that comes to mind is when we implement our Light-Duty Vehicle, Zero Emission Vehicle Program, we have an exempt contract with the ARB and we provide funding for them for the Clean Vehicle Rebate Project.

So our leveraging, typically in our

competitive solicitations we have a minimum leveraging requirement of 1:1, so for each dollar of ARFVTP funding we're expecting a match share of at least one dollar, and we certainly encourage higher cost sharing under our awards.

As Commissioner Scott, mentioned, we have experienced about a 1.8:1 leveraging in the program to date. That leveraging comes from the private capital from federal funds and from local funds, so it's a good mix of sources that we have. And what this does is it just helps us increase the breadth and our ability to advance the Alternative Fuels and Vehicles Technologies throughout the state. Now, it also enhances the economic and job benefits that are resulting from these projects.

What we're looking at in the future, and I think I touched on this a little bit, you know, we're interested in matching the funding mechanism with the state of the technology or the market. Like I mentioned, with the Electric Vehicle charging, we may be at a point in time where we can switch to a different funding mechanism; again, it's still something we need to talk about internally and get input from you

today, and into the future on is this an appropriate mechanism. I hope to hear a lot of good ideas today.

And then also, how do we go about increasing our leveraging? As technologies mature, perhaps they need to be incentivized less by the State of California, that is something we're interested in hearing about, as well. You know, the best thing we can do is ultimately put ourselves out of business in a market or technology area; let the private market -- let it be incentivized by the cost benefit of the technology itself. So if it's worth a company to switch to an alternative fuel, they should be making those decisions without an incentive. We're not there, obviously, but that is our goal at some point, you know, that we will be backing away and letting the private markets take over.

We also want to seek options on how we increase program benefits with our limited funding. The way to do that is obviously increasing our leveraging and getting more projects out there, leveraging more vehicles and more facilities, alternative fuel facilities to be built in California, utilizing less California

State funding.

Finally, we're working with a number of agencies, I'll call out the California Alternative Energy and Advanced Transportation Financing Authority -- and I thought our acronym was a difficult one -- thank you, Renee, I know Renee Webster Hawkins is here today. And while we're working with them and others to look at what are the options we have available, we do have some ideas we're looking at and, again, I think today is going to be a great opportunity to hear some feedback on what everybody here thinks today.

So I never give a presentation without ending with this. These are some websites where our funding opportunities are, we're always looking to make sure that all of our stakeholders are aware of what our current funding opportunities are. The first webpage is where you can go for our active funding solicitations, and even though it says "contracts" in the line, that includes everything, and that will be contracts, that will be grants, that will be loans. So if you're interested in seeing what's currently available from the Energy Commission,

please feel free to visit there. Subscribe to our Opportunity List, we'll get automatic emails as new opportunities become available or as they change over time. And then, for the ARFVTP Program, we do have a little forward looking listing of what we think our upcoming solicitations will be, they're not on the streets yet, and that's the third URL that's on this slide. So thank you very much and back to you, Commissioner.

COMMISSIONER SCOTT: Thank you, John. That was a great presentation and a really informative overview of how our Alternative and Renewable Fuel and Vehicle Technology Program typically funds projects. So thank you for that.

I would like to welcome Commissioner Douglas to the dais. Let's now turn to Professor David Greene from the University of Tennessee. David Greene is a Senior Fellow of the Howard H. Baker, Jr. Center for Public Policy and a Research Professor in the Department of Civil and Environmental Engineering. In 2013, he retired from Oak Ridge National Laboratory as a Corporate Fellow. He is an author of more than 250 professional publications on transportation

energy issues, including over 100 articles in peer-reviewed journals and the National Research Council Reports. The 2012 recipient of the Transportation Research Board's Roy W. Crum award, he is also an Emeritus member of both the Energy and Alternative Fuels Committees of the TRB and a Lifetime National Associate of the U.S. National Academies. Thank you, Dr. Greene, for joining us today.

DR. GREENE: Commissioner Scott, it's a pleasure to be a part of this. I think the work that you all are doing today is extremely important and I hope to provide a little bit of context to that. Based on findings from studies by the National Research Council, the Transitions to Alternative Vehicles and Fuels Report shown here, and studies that we did here at the Baker Center, using the same model and the same technical assumptions to try and better understand how energy transitions can be accomplished in the Light-Duty Vehicle sector. Next slide, please.

So I think it has become clear that environmental sustainability requires the world to undergo an energy transition, and this is not

just true for electric utilities, but for the transportation sector, as well. Here are some quotes from major studies, the Global Energy Assessment, a huge undertaking by the International Institute for Applied Systems Analysis, and without question a radical transformation of the present energy system will be required over the coming decades. They also go on to say that essentially we have to phase out petroleum use by 2050 in order to achieve sustainability.

The reason the IPCC Mitigation Study that's been in the news as the only safe path forward is to arrive at a carbon neutral world in the second half of this century. And our own National Research Council Transition Study, which I showed on the title slide, says that we are going to have to have multiple solutions to this problem, definitely including energy efficiency, which is emphasized by the Global Energy Assessment, as well, but also a transition to low carbon energy. Next slide, please.

I'd like to point out that this is a new challenge for public policy. This is not the environmental externality problem of the previous

century, if you will. This is a new kind of problem. This is a problem that takes decades to solve and how society values the future versus how the markets value the future is a critical difference. It requires technological progress which we are seeing every day in Electric Vehicles and Fuel Cell Vehicles and in other technologies. But that technological process is never guaranteed, and so this introduces some uncertainty into where we're going.

It certainly involves environmental externalities. Global climate change and greenhouse gas emissions is a classic environmental externality. But there are also other market problems here, monopoly power in the world oil market and the implications of oil dependence. And there are other market shortcomings, the Energy Paradox, for example, why markets tend to under invest in energy efficiency.

And the process of change, the process of transition itself creates network external benefits, not only external costs, but external benefits are being created and positive feedbacks to the system through the value of fuel

availability, the car buyers, the value of having more cars out there to the profitability of fuel retailing, learning by doing spillover effects, and reduction in risk aversion of the majority of consumers, and the value of diversity in choice which fights with scale economies which are extremely important in the automotive industry. These kinds of things create positive feedbacks which lead to path dependencies and tipping points, making this a very complex problem.

And then we have deep uncertainty about how future markets will be and how future markets will react to advanced technology, what the technology will be in the future. And we also need to create more knowledge of how this process works, and that in itself creates some certainty for us, and not really understanding all of the aspects of this problem.

So this is a problem that goes beyond internalizing externalities and it means that policies such as incentives, such as advanced placement of infrastructure, is extremely important to making it work. Next slide, please.

So from these studies, the National Research Council Study, the ICPP Studies, what

have we learned? I think that we have learned a great deal, even though there's still a great deal of uncertainty. And I'd like to review in the next few slides what I think we have learned from these studies, both in our Safe Transition Study which looked at 80 percent reduction in greenhouse gas emissions and petroleum use by 2050, and what policies and technologies would be necessary to get there, and the ICPP Study which took that same model and same assumptions and looked at how policies in California interact, and the 177 states interact with the rest of the U.S. and, indeed, the world in making this transition happen. Next slide, please.

So I think the first think I want to say is this is not easy. I like to show this slide of U.S. Energy Consumption and Transportation simply because it so clearly shows that, despite some very serious and well-organized efforts in the past, it has been not possible yet to truly dislodge petroleum as the primary energy source for transportation. But we're going to have to do a lot of things. We're going to have to do fuel economy standards beyond the 2025 standards, we're going to need some biofuel, I think, a low

carbon biofuel, we're going to need some pricing mechanisms, we're going to need new low carbon vehicles and fuels. Next slide, please.

Continuous Improvement in Energy Efficiency, I think, is emphasized by every study that looks at this carefully and rigorously. This shows from the NRC Study what assumptions they made about continuing improvement in Energy Efficiency; it's dramatic, but it's not more dramatic than what's been accomplished in the past. And the 2025 Standards get us a long way towards where we need to go. Still, we are talking about vehicles that are about three times as efficient as the vehicles we have today on the road. Next slide, please.

A very interesting result came out of that NRC Study based on a very careful analysis of the future technologies and how improving energy efficiency would affect the competitiveness of technologies like Battery Electric Vehicles and Fuel Cell Vehicles. And one of the things that was concluded is that it's possible for Fuel Cell Vehicles and Battery Electric Vehicles eventually to be cheaper than Internal Combustion Engine Vehicles of a

comparable nature. And the reason for that is essentially when you improve energy efficiency by reducing the mass of the vehicle, maintaining its size, reducing the aerodynamic drag, reducing the rolling resistance, essentially reducing the load and the power requirements for the drive train, downsizing of the drive train, while maintaining performance, benefits technologies like Battery Electric Vehicles and Fuel Cell Vehicles more than Internal Combustion Engine Vehicles, because the cost scales better, more linearly, with the power requirement. So this is a TD finding and assumption, I think, from that NRC Study, it takes a long time to get there, you can see this doesn't happen, they don't think, until after 2040, but there is a future in which these technologies cost less. Next slide, please.

Second, as I said previously, this is not only about externalities and, in fact, in the NRC Study when they internalize their best estimates of the external costs of climate change and oil dependence and made that a tax on gasoline effectively or a tax on carbon, they found that the transition didn't happen fast enough, let's say. Because here we see after 2040 when

electric vehicles get to be cheaper than gasoline vehicles, we see them coming into the market without explicit policies to deploy infrastructure or provide any incentives after 2016. So we see some coming in, but this doesn't happen fast enough and it doesn't happen extensively enough. So internalizing the externalities alone, it's a good thing to do, it's a helpful thing to do, but it's not sufficient. Next slide, please.

Another lesson is that this is going to take decades. The time constancy for change to allow manufacturers to retool and to expand new technologies across their product lines for those technologies to penetrate the market, to develop the infrastructure, and then to turn over the fleet of vehicles, we are talking three decades anyway. This takes a long time, even for what you see here which is one of the successful scenarios from the NRC Study that met the goal of reducing greenhouse gas emissions by 80 percent. Next slide, please.

This is a global problem of energy transition and this is also a global industry and a global market for vehicles. And what happens

in the EU matters to California; what happens in Japan and Korea and the rest of the U.S. matters to California. And what we see in the first scenario is one in which California goes ahead with its ZEV Program, gets a very successful result on PHEVs and BEVs, but because the rest of the U.S. is not deploying any Hydrogen infrastructure or doing anything to incentivize -- in this scenario, anyway -- to incentivize these advanced technology vehicles, it takes a long time to get the market going.

The second slide in the bottom left shows what happens if the U.S. is still not doing -- the rest of the U.S. outside of California and the section 177 states is not doing anything, but the rest of the world is in the EU, and in Japan, and in Korea, they are, but they drive down the cost of the advanced technology vehicles and help accomplish the learning by doing, and that makes a big difference. Next slide, please.

And this is rather obvious, but a critical part of the energy transition is infrastructure. In the top slide here you see what if you don't deploy any Hydrogen infrastructure. Well, you don't get any Hydrogen

Fuel Cell vehicles. You do get a significant number of PHEVs, which benefit from infrastructure, and BEVs which benefit from infrastructure, but it's not as critical to them as is the infrastructure to Hydrogen Fuel Cell vehicles. Next slide, please.

And, yes, the timing and intensity of policies matter. Here's an estimation of total net present value benefits depending on when you start, in this case, the ZEV Program in California and 177 states, followed five years later by a similar national program. Okay, so the benefits decrease, the costs decrease, the costs of subsidies decrease, but the benefits decrease even more and even faster. So in this case, it's beneficial to get started early is what it says. On the other hand, this does not really reflect our uncertainty in these calculations and so the fact that we don't really know that the technologies are going to develop as assume by the NRC Study is not reflected in these numbers. Next slide, please.

This is a very surprising slide, but illustrates the importance of these positive feedback effects. This is a case of a very well

timed hundred dollar subsidy, a hundred dollar per vehicle increase in the subsidy of Fuel Cell vehicles, and you can see that starting in 2020 and then it skyrockets. Why? Because of the positive feedback's effects -- scale economies, learning by doing, and that sort of thing. And then the benefits in terms of fuel savings, in terms of reduced cost of fuel availability, in terms of reducing the majority of risk aversion, those continue well beyond. But the only point here, it's a rather complicated slide and hard to explain, but the point is here that there are potentially very strong positive feedback effects in this process. Next slide, please.

This was kind of a shock to us working on the NRC Committee on transitions when we saw this result, but it kept coming up over and over and over again. Yes, there is a period of net subsidies and even net negative social value in the early part of the transition, but then this gets swamped in the long run by the benefits, and this is comparing two cases of equal technology, one with and one without transition policies, so this is the impact of the transition policies, not the impact of better technology or changes in

prices or anything, this is just the impact of having the policies in place. And you can see that the total benefits, these are annual benefits discounted back to the present value at 2.3 percent per year, is at least an order of magnitude bigger than the cost. And this is a very comforting result, I think, because probably we're underestimating the cost, probably we have missed something, try as we might to include everything and to get it right, there's a lot we don't know, and things always don't go as easily as you think. So having total benefits that are at least on order of magnitude bigger than the cost is a good thing to see. There is a better world there, in other words. Next slide.

I mention uncertainty a lot and there's deep uncertainty here. And we tried in the study for ICCT to characterize uncertainty both about the technology, in some cases the technology doesn't improve at all, and in some cases it's even a little better than expected by the NRC Committee, and uncertainty about the markets, so we have about 20 different market parameters that we describe as probability distributions here, and simulate what that means for the probability

of success, the probability that benefits will exceed costs, and as you can see it's about a 90 percent probability that benefits would exceed costs, but there is this time period of about 10 years in the beginning where it's almost guaranteed that they will not. And so this is a difficult problem in which you have to proceed with policies even though the benefit is yet to come in the future.

And the uncertainty is quite large, as you can see. And I think here the lesson comes from Rob Lempert's work at the RAND Corporation, which showed that we don't need to know the optimal policy, we don't need to know in advance what the very best policy is because an adaptive policy, one that changes and responds and learns as it goes along is almost as good as an optimal policy faced with this kind of profound uncertainty. Final slide.

So these I think are the lessons we've learned from what we've done, there's still a lot more that we don't know. There's still much to be understood about this process, but I think it's very clear that we do need to make this energy transition, it's extremely important for

society, and that the kinds of things that you are doing today are an essential part of making that happen.

So thank you and good luck with all your work today.

COMMISSIONER SCOTT: Thank you very much. This is a really interesting presentation and it's just, I think, a great framework or overview for us to kind of think about the importance of the incentives that we have here in the state going forward. I had a couple questions for you.

Up on Slide 5, you mentioned the national numbers and I suspect I know the answer to this already when I think about the number of Electric Vehicles on the road in California versus the number of total vehicles on the road in California, but I wonder how this mix might look different, or if it does look different in California, if it was California-specific versus national.

DR. GREENE: Okay. Is it Slide 5 you're referring to?

COMMISSIONER SCOTT: Uh-huh.

DR. GREENE: Or a different slide?

COMMISSIONER SCOTT: Yeah, Slide 5 with

the big red chunk.

DR. GREENE: Oh, okay. So this is a history and basically it just shows that, you know, we had a very small dent in reducing petroleum dependence, and almost all of that that we have accomplished has come from blending Ethanol with gasoline. Even in California, the number of electric vehicles and their energy use is still very small relative to the rest of the country, but as you well know, the market share of these vehicles in California is a few times the national market share. So we're still at the bottom of this S-shaped curve, if you will, even in California.

COMMISSIONER SCOTT: Yep. Thank you. And then up on Slide 7, you mentioned here that when we get out into the 2040-2050 time range, the prices of the Fuel Cell Electric Vehicles and the Battery Electric Vehicles may be less than an Internal Combustion Engine, and I just thought that was a really interesting point and I was wondering if you would -- I don't know if "reiterate" is quite the right word, but walk us through that one more time because I thought that was really interesting.

DR. GREENE: Sure. And I went through this very quickly, so of course. These prices are intended to be high volume -- they're theoretical in a sense, they're high volume, fully learned prices. So in the model that the NRC Committee used, the actual prices at any given time, especially early in the period, would be much higher because the volumes would be lower and there would still be a lot of learning to do. So these are the prices that you approach in the long run as you get more and more vehicles sold. But the point is that there is an effect of advancing technology; the Battery Electric Vehicles eventually have batteries that cost between $150 and $200 a kW hour, the Fuel Cell stack costs get down to $20 to $25 a kW, and so there's a large amount of technological progress assumed in these prices in the future.

But also, what we see here that causes the Battery and Fuel Cell Vehicle costs to crossover the Internal Combustion Engine Vehicle costs is the fact that the cost of a battery electric motor system scales much more linearly, much more direct proportion to the power of that system. So if you preserve a 100-mile range, for

example, and the vehicle power requirements are reduced by 30 percent, let's say, because you've taken a lot of mass and aero drag and so on out of the vehicle, you can reduce the battery pack proportionately, which reduces the cost of the vehicle. But with an Internal Combustion Engine, you don't get the same cost savings because there's so many moving parts and so many auxiliary systems that have to be maintained regardless of the size of the engine. And that's essentially what you see going on here is, as you get later in the period of better scaling of costs for the advanced technologies with the power requirements as the vehicles are made lighter and more aerodynamic and with lower rolling resistance.

COMMISSIONER SCOTT: That's really fascinating. Okay, I have two more and then I'll see if anybody else has questions for you. So on Slide 8, you mention kind of what this looks like if there are no vehicle subsidies after 2016 and no early infrastructure. And I'm wondering if you have a thought for us on, if we continue vehicle subsidies after 2016 and we do make early investments in infrastructure, how does that kind

of shift -- I would imagine that would shift everything over to the left a little bit.

DR. GREENE: Oh, very much so. And you'd get not only Battery Electric Vehicles, you get Battery Electric Vehicles and Plug-In Hybrid Electric Vehicles coming in sooner, and with eventually greater market share, and you'd get Hydrogen Fuel Cell Vehicles coming in, and eventually taking, well, in our scenarios, 40-50 percent of the market by 2050. So by the time you get to 2050, you have the overwhelming majority of vehicles are Electric Drive. And so it's a combination of starting sooner and having a bigger impact in the long run. And as you saw the costs of the subsidies, it's actually rather small compared to the long run impact. That is what our results kept showing us from the NRC Study and from the ICCT Studies, of course this is contingent on continued technological progress, but we keep seeing technological process. I just talked to an automobile manufacturer recently and he said, "Well, we've now figured out how to get the platinum loading for a Fuel Cell system down to below 10 grams for a 90-kilowatt system." This was one more giant

step towards making this technology work and be cost-effective, and we've seen the same thing for battery costs coming down. There's still a ways to go. We still have expensive Hydrogen storage tanks and we still have the need to get infrastructure out there, and there's still a ways to go in getting battery costs down, but what is achieved over the past is very impressive and I think bodes well for the future.

COMMISSIONER SCOTT: Excellent. And then my last question -- actually, I have lots and lots, but the last one that I'll ask is on Slide 11, and I wanted to know if when you look at these scenarios, so let's say we look at the one on the bottom left there, you have Fuel Cells at 45 percent, battery electrics at 20 percent, and Plug-In Hybrids at 10 percent, so can you -- is that additive? So that means in 2050 they have the potential to be -- what is that? Seventy-five? Am I adding that right?

DR. GREENE: Yes.

COMMISSIONER SCOTT: Yeah, 75 percent of the market.

DR. GREENE: That's right.

COMMISSIONER SCOTT: Okay. And I ask

that --

DR. GREENE: That's right, that is additive.

COMMISSIONER SCOTT: Cool.

DR. GREENE: And I think it also illustrates the fact that there's some substitutability here, so that when the Fuel Cell Vehicles don't come on and do really well, or they're not even there at all, then you see more Plug-In Hybrids and more Battery Electric Vehicles. But when you are successful with the Fuel Cells, you see more total Electric Drive Vehicles overall.

COMMISSIONER SCOTT: I like that. So this is really interesting because we had in our first workshop both the Air Resources Board came and they were speaking of needing about 90 percent of the vehicles by 2040 if we're going to meet our climate change goals, and then South Coast Air Quality Management District came and they said, "Oh, but wait, if we're going to meet the clean air challenges that they have on the South Coast, they need it to be a little earlier than that." And so the message of the story from them was more, faster. But it's really

interesting to see these scenarios and how it all fits together in the information that we've been gathering so far.

DR. GREENE: Right. And the energy efficiency matters, too, so that matters a great deal what assumptions they've made about energy efficiency. And also, there's a fair amount of biofuel in these scenarios, it's a drop-in biofuel made by pyrolysis. Whether that's going to turn out to be the right approach or not, you know, we don't know.

COMMISSIONER SCOTT: Uh-huh. Oh, this is just fascinating. Do you have any questions?

COMMISSIONER DOUGLAS: This is Commissioner Douglas. I don't have any questions, but I want to thank you for the presentation, it was really interesting.

DR. GREENE: Thank you. My pleasure.

COMMISSIONER SCOTT: Absolutely. Thank you so very much. Okay, so now we will turn to the next part of our agenda, which is a panel where we will explore some of the financial instruments provided for in A.B. 8, and so I'd like to see if Tyson and Renee Webster-Hawkins and John Rhow can come up. We have some spaces

for you here. And then I believe we have Charlie Myers on the WebEx. We're still looking for Cisco, right? Okay.

MS. RAITT: So we can either turn the slides for you, or you could come here and turn your slides yourself, whichever you prefer.

COMMISSIONER SCOTT: So let me warmly welcome Tyson Eckerle from the Governor's Office of Business and Economic Development. Tyson was recently appointed to serve as the Zero Emission Vehicle Infrastructure Project Manager in the Governor's Office of Business and Economic Development. In this role, he focuses on streamlining the permitting process for Hydrogen and Plug-In stations, so that these critical stations can be deployed as quickly as possible.

Prior to joining Go-Biz, Tyson served as the Executive Director of Energy Independence Now, where he and his team most recently developed the Hydrogen Network Investment Plan, the body of work that he will be talking about here today. So thank you for joining us, Tyson.

MR. ECKERLE: Great. Thank you, Commissioner Scott. So I'm Tyson Eckerle with Go-Biz, and what I'm going to be talking about

today is actually work that I did with Energy Independence Now, so this is not something coming from the Governor's Office, this is coming from prior to that, just to be clear, but I think they would believe in it if we ran it through, but….

Just a little brief background. The Hydrogen Network Investment Plan Project was supported by the California Fuel Cell Partnership, Air Resources Board, South Coast Air Quality Management District, Toyota Daimler, EIN donors, so Energy Independence Now donors, the CEC had a lot of input into this, and it was an iterative process. We developed a financial model that really took into account the Hydrogen Fueling Stations, in particular, different market segments and scenarios, and throwing different incentive structures at the system to look at how an incentive could impact what the State invests and also the financial picture for a station owner.

So just to kind of give a little bit of backdrop, actually what I'm going to be talking about today is a specific concept within the Hydrogen Network Investment Plan called Market Insurance Grants. And what they are really

trying to do is target the uncertainty in the marketplace. So there's uncertainty both on the station developer side, will the cars come in time to help fund the ongoing operations and maintenance of a station? And on the vehicle side, you know, will the stations be there when my cars come to market?

And so what we did is kind of this backdrop is these market scenarios, so the first one here is a graph of the 2010 surveys that the California Fuel Cell Partnership did, asking the automakers if the infrastructure was not constrained, and there was plenty of infrastructure out there, how many cars could you bring to market? And so what this blue line shows is the total number of vehicles on the road, and that's scaled on the left axis there, working its way up. The yellow bars represent the number of stations that are actually out there, kind of this is a scenario that we developed, so you look at getting that 68 stations was the original target by 2017, and you can see that very quickly under that scenario the blue line is above the yellow line, so it means we have not enough stations and capacity to

support the amount of vehicles that were expected to be out in the marketplace if you follow those 2010 surveys.

The next slide here is what we call the Zero Emission Vehicle Likely Compliance Scenario, and that is what the Air Resources Board put together and their Zero Emission Vehicle Rulemaking, okay, what is a likely compliance path under the Zero Emission Vehicle Mandate in terms of how many Battery Electric, Fuel Cell Electric, and Plug-In Hybrid Electric Vehicles would be there. So this, what happens here is if you build out your network to 68 stations by 2017, it would be 2020 before we would have any capacity constraint and need to expand that network.

And if you're a station developer, you have to think, okay, well, what if the cars come out a lot slower than that? That's just one scenario, this is one quarter of that ZEV likely compliance scenario. And in this case, if we got to 68 stations and 68 stations just to say kind of as a background, as a coverage number, and so that's within the marketplace, the California Fuel Cell Partnership, we're very diligently

figuring out, okay, how many station access points do we need to adequately sell these vehicles to the marketplace? And basically if you go into a dealership, you know, I'd like to go to Santa Barbara, can I do that? Yes. Can I go to Palm Springs? Yes. And those types of questions can be answered.

So we got up to 68 stations by 2017, but the cars came much slower, you're facing a long term of under-utilized stations, and that's a scary scenarios for a station owner.

So capital cost share which was the approach prior to 2014, capital cost share of the stations can definitely help reduce some of the station uncertainties. So this graph here just shows the old numbers, you know, 70 percent government cost share, and then 30 percent from the private sector. Okay, it looks like some of this stuff got translated a little weird, but what this graphic is, it is showing the relative rates of return for a station, and so on this left axis here, you can see the cost of the station, so starting at a million dollars at the top, going to $2.4 million, so there's some uncertainty on how much of the cost of the

station, and this is a 500 kilogram a day station built in 2015. Along the top is actually the price of Hydrogen, which is very important for the consumer to know. So as you move towards the left, the prices are better for the consumer, $8.00 a kilogram, which is very competitive with gasoline today, and you move towards the right, and you get $12.00 a kilogram, it's much better for the station provider.

So what we've done here is highlighted it just so you can kind of point it out, that 12.4 percent internal rate of return is if we had a ZEV likely compliance scenario, so that kind of middle scenario that I showed you, what would the rate of return be for a two million dollar station charging nine dollars a kilogram for Hydrogen? So it looks pretty attractive in the early market, you know, a lot of people would be willing to take that to get to a toehold in the marketplace.

Let's see here, yeah. But let's say instead of coming out in the ZEV likely compliance, it comes out a quarter of the ZEV, all of a sudden that same station that you can see is -5.9 percent rate of return. So they're

losing money over the 10-year life of the project. And you can see these reds and greens are basically showing you would have to have a million dollar station, so really reduce the cost of the station, and charge $12.00 a kilogram to make this thing make any economic sense from a private developer perspective.

So a concept that we put out there, and I'll go into the details on the next slide, but it's just kind of market assurance grants are helping to pay for our operations and maintenance support, and so the Energy Commission did that this year, they offered up to $100,000 a year for three years moving forward, and so that helps kind of bridge that operations gap. You can see what something like that does, and actually I'll go into a little bit more of the particulars about how the market assurance grant differs from that strategy slightly, but you can see under a quarter ZEV scenario you can keep the station owner from losing their shirt, so to speak, by helping fund operations and maintenance expenses as needed. And so just kind of walking it back you can see, you know, you're in the negative without an operations and maintenance support or

market assurance grants and then you can go into the positive.

So the picture, this is kind of a picture of what this would look like from an individual station owner perspective. And so this is the Zero Emission Vehicle Likely Compliance Scenario and you can see I've highlighted down at the bottom here -- sorry, it didn't translate well, it's probably a Mac thing -- but the capital grant plus market assurance grants on the very bottom, if you added those in, you'd get a 16.4 percent rate of return under the ZEV Likely Compliance Scenario. That 12.4 percent is the one they show without any operations and maintenance support.

So what the Market Assurance Grant does is basically, if cars don't come to the full capacity of the station, you would make up the difference there and the way it would have to be set up is in a manner that it is always better to sell a kilogram of Hydrogen than it is to get the market assurance grant. What this green bar here does, so the green line shows the station's operational profit, not including capital costs. The dashed green line shows what it would be

without any operations and maintenance support or Market Assurance Grant support. The solid green line shows what you would do if you did offer that operations and maintenance support. So the horizontal line down the middle is at zero, so basically what we're doing is bringing the operational support to zero. If there aren't any cars coming, they're not losing money on the station is the idea. So under a ZEV likely compliance scenario, that would cost the station in total -- cost the government if the government was funding the Market Assurance Grant -- about $114,000, and that's in this kind of MAG support column if you look at the very bottom over here.

And so that's one scenario. Now, if you look at a Quarter ZEV Scenario, there's a much longer timeline need for Market Assurance Grant support going out. So if the station was built in 2015, it would need support all the way through 2020. So to keep it from being a negative rate of return, you would have to add operations and maintenance support, or Market Assurance Grant support. And this turns out to be about $427,000 based on our scenario. And you can see down at the bottom we're assuming $9.00 a

kilogram for these things, $5.50 to buy the Hydrogen at a wholesale cost and being able to sell it, you know, and make it a $2.18 margin on the sales.

So the general idea here is really tying operation and maintenance support to station throughput. So as throughput increases, the operation and maintenance support decreases. And that's the general fundamental market assurance grant concept.

One thing to keep in mind is, when we pitch this idea, is to have 10 years' worth of MAG support, Market Assurance Grant support, and being able to go at it from a network-wide perspective so it wouldn't be tied to an individual station. Each individual station would have access to this money, but the idea being that you could apply these Market Assurance Grants to the stations most in need, and it's almost like a cross subsidization of stations. So hopefully, did that make sense? Great.

So just as kind of a closing thing, and I'm happy to take questions however you guys want to do it, but the in-depth report is available on the Energy Independence Now's website. My new

contact email is here, and Remy Garderet, my colleague at Energy Independence Now, and now the Director there, his email is there as well.

COMMISSIONER SCOTT: Thank you for this informative presentation and for pinch hitting for Energy Independence Now today. I don't have any specific questions right this minute, but I do have some for when we're in discussions with the panel. But, Commissioner Douglas, any questions?

COMMISSIONER DOUGLAS: So I think I just have one question, and go ahead and answer from there, it's easier. What can you tell us about the likely timing of roll-out of vehicles? It's been a little while since I've kind of dived into this area, so I'd be very interested to hear.

MR. ECKERLE: Yeah, I mean, there's a lot of different moving parts happening. I think the roll-out is definitely not that 2010 scenario anymore, and that never really was a realistic scenario, it was unlimited infrastructure. And so I think this year is going to be a very pivotal year. My new job is getting these stations that had been funded in the ground, and that really changes the whole dynamic, and so I

think, you know, Hyundai, they're bringing cars to market in California by June, they're saying now; Toyota is making a huge push in 2015; and then Honda is right behind. And so I'm very optimistic. As far as specific numbers, we don't have them, but I think it's one of those things that's going to be a positive feedback loop.

COMMISSIONER SCOTT: Well, I think it's a really interesting point in the slides and how you think through the Market Assurance Grants, how strong the compliance with the ZEV is, and how that changes the numbers, and pretty dramatically depending on the scenarios here, so they really are tied together.

MR. ECKERLE: Right. And just one thing, too, you know, Battery Electric Vehicles and Plug-In Electric Vehicles are exceeding what the Air Resources Board was expected under the ZEV Mandate, so it's becoming kind of a market driven thing and less of a regulatory driven thing. And I think you'll see the same thing happen in the Fuel Cell space if we can get the infrastructure out there and the automakers have confidence that the infrastructure will be there when their cars come, and that's the key.

COMMISSIONER SCOTT: Great. Thank you, Tyson. We're now going to turn to the WebEx where we have Charles A. Myers from the Massachusetts Hydrogen Coalition. Charles Myers has been the President of the Massachusetts Hydrogen Coalition for five years now and a member of the Board of Directors for over seven years. He is the Chairman for the Massachusetts Fuel Cell Electric Vehicle Working Group and a participating member of H2USA. He also provides support to the Massachusetts Electric Vehicle Initiative Task Force. He is a founder and advisor for Trenergi -- I hope I said that right -- Trenergi Operation, an early stage Fuel Cell company using HTPEM technology, you'll have to explain that to us, to develop a microchip product and serves as a technical reviewer and finalist judge in the Massachusetts Clean Energy Center Catalyst Awards Program. Mr. Myers serves on the Medway Energy Committee in Medway, Massachusetts, a Massachusetts Green Community. Additionally, he is a patent holder, co-author of two national standards, published a wide range of technical articles, and is a recipient of the Lifetime Achievement Award from the Massachusetts

Association of School Committees. Welcome, Charles.

MR. MYERS: Well, thank you very much. I appreciate the opportunity to visit you via the Web on this. We'll go to the next slide.

Massachusetts formed up a Fuel Cell Electric Vehicle Working Group to create programs that would effectively launch Fuel Cell Electric Vehicles, in addition to the Battery Electric Vehicles, in the Commonwealth of Massachusetts. We put together a working group with a cross section of industry, state and federal, and fleet operators and automakers initially to sit down and talk about what we could do to bring these vehicles into the state. From those discussions, we said we should create a demonstration program and that demonstration program then said, well, wait a minute, the cars are almost here now, the Hydrogen generation technology is mature enough, we should look at ways we can actually start the deployment program.

And so we decided to create a program that parallels the solar industry, where the solar industry in our state launched and moved forward creating Power Purchase Agreements.

Someone put up several hundred kilowatts of solar and got a Power Purchase Agreement for that amount of power, and that Power Purchase Agreement was then marketed to third parties by the solar installer, and that was how they raised the money to put the solar panels up.

So what we did was take that work with Hydrogen and can we create something called the Hydrogen Purchase Agreement? Well, certainly the consumer side of the equation is more difficult, but with the fleet operator side of the equation where the vehicles are more operated in a return to base, or in general close proximity, we saw an opportunity to create a Hydrogen Purchase Agreement that was between the fleet operator and the station operator, and so we've been proceeding down that path. It does require some front end work for us to do it in that we have to average out what the daily mileage is of the vehicle, so that we can match the number of vehicles that are being ordered against the station size.

Now, I know that there are different station sizes being talked about in different consumer markets, 250 kilograms, 500 kilograms,

1,000 kilograms, we looked around and said what stations were readily available today and sizes, and we said 45 to 50 kilograms, and that represented somewhere between 25 and 50 or more fleet vehicles, which seemed to be a good fit. So by recruiting National Grid, the symbol in the top right of the fleets column, is the City of Boston. We've also had conversations with Zipcar and Hertz, the General Services Administration in Nashport, and these people are all there to say are you willing to maneuver? Are you willing to adjust the size of a fleet order to the output of the station? And they've all said yes.

So then we turned around and we went to the Hydrogen generation industry and said, "If we do this for fleets, and use a Hydrogen Purchase Agreement, can you go out and raise money to put the station in and not necessarily rely on the state for funding?" And they turned around and said, "Yes, this works for us." So we happen to have four different companies in the state that make this equipment, so we were blessed in that respect. So we then said, "Well, what's the lead time for the stations?" And they told us the lead time for the stations would be something on

the order of 10 to as much as 12 months, and with that in mind, we queried the auto industry, and Tyson had it about right on that, Massachusetts will follow California, we won't get them at about the same time, but we'll be shortly thereafter, so things seemed to fit together.

We recognized, because we are a 177 state, we are also one of the eight states that signed the ZEV MOU on that, and when my bio was read, there is a Massachusetts Electric Vehicle Initiative Passport, I just call it MEVI, and MEVI is working on combined Battery and Fuel Cell deployment programs, incentives, and rebates for the vehicle side to move all that through. So we know there's this retail market. We want to build the critical mass of the stations using the Hydrogen Purchase Agreement model, and then transition and start leaning rock so that the station in the initial phase would be 100 percent fleet, in the later phase it might be 60 percent fleet, 40 percent retail, then 30 percent fleet, 70 percent retail. And so we're looking at ways that we can do that and transition and move through on it. Next slide.

So the idea also is not just to use

fleets that we think of as light-duty vehicles, but what other ways can we put a station on the ground and utilize that Hydrogen. So working with the Department of Energy, we noodled on a variety of ideas and we're actually going to be putting a Fuel Cell Bus on the ground by the end of this year. We're looking at Logan Airport as a potential location. We've had discussions with big box retailers to look at using Fuel Cells as range extenders in their vehicles, and those discussions got interesting. Some of the earlier comments already in this meeting talked about efficiency and one of the big box retailers that we visited with was talking about the fact that to carry an extra 2,000 or 3,000 pounds of batteries meant that that was extra energy that was needed, it was a whole different chassis of truck, it just had a whole raft of issues with it, but if a Fuel Cell went on there, it would be lighter duty, lighter weight, and so they saw that as an option on it. And then we're looking at combined use fleet sites with rapid transit. Next slide, please.

So in Massachusetts, we do have some Hydrogen. We have a station up in Billerica in

the top left, northwest corner of Boston inside 495, it's run by Nuvera, we've got several Toyota Highlanders running there, and then in the top right, pointing down to Charlestown, Massachusetts is where the Fuel Cell Bus will be located at one of the MTBA facilities, and then on the bottom right, Braintree, MA, for those of you that have driven around the Boston area, if you go to the southeast expressway down 95, that junction right there is Braintree. At the end of June, we'll have a 50 kilogram a day Electrolyzer site there. And then we also have a food distribution center on the south shore operated by Sysco Foods that has one there and that site is interesting because they also provide food for hospitals and nursing homes, so they're a site that has to operate regardless of the weather or the environment. Next slide.

This is just to show we've done the mapping exercises and we've identified the corridors which are in the top left where the residential communities and earned income and people are located in the right, and then distilled some of it down to a general Greater Boston map and ignore the time dots on it, some

of that has already passed, but if you go to the next slide, what starts to work out for Boston is we think we can do 10 stations if you take the outer arc is 495, the inner arc is 128, and then you've got the commuter slope that goes in and out of Boston, and where those intersect plus two in the center of Boston, and we feel that we can effectively blanket the Greater Boston marketplace and do a complete Fuel Cell integration on it. We're looking at the fleets that fit into those loops so that we can work on the co-location and the reduced dependence to go along with it. Next slide.

So as we move forward in Massachusetts, we are looking at the fleet program, we have talked with the auto companies and they're on board with that, we've talked with the fleet operators and they're on board with it, and we've talked with the equipment companies. So it seems like we're in a go mode on that and we actually expect to start going into some negotiations toward the middle of this year into the third quarter so that, by the end of next year, we should have in Massachusetts roughly three to five fleets, three to five stations operating

using the Hydrogen Purchase Agreement thought process, and then moving forward we'll reduce that reliance on it, as I mentioned, we will offer rebates, the rebates for the vehicles will be on par with the Battery Electrics. We're actually basing the rebates based on the energy storage on the vehicle. And so that's the general direction. We recognize we're part of New England, so we are working with Connecticut, we're working with Rhodes Island, New York State, and so we'll put those connector stations in and they will be a combination of site generated, as well as deliver Hydrogen in the program. And thank you very much. That's the Massachusetts direction.

COMMISSIONER SCOTT: Well, thank you very much, Charlie, for presenting that to us. I saw this first in Washington, D.C. when we were at the Hydrogen Technology Advisory Committee Meeting and I just thought it's such an interesting and innovative model. I like how you are developing the partnerships with the Hydrogen Purchase Agreement, and using a broad set of fleets to really jumpstart this. And you're matching the supply with the anticipated

throughput, and I think it's neat and innovative, and I wanted to make sure that it was something that we knew more about here in California.

A question that I have for you is, you mention that there will be the retail phases, right? So you kind of phase out -- and it was a 30 percent reduction, and this is on Slide 2, and then a 50 percent reduction, and then 75 to zero. And I'm wondering if you're also thinking about building stations that could be scaled up, so if additional cars or fleets wanted to use them, that the stations could also be scaled up?

MR. MYERS: The answer to the question is yes, and that's why we're trying to negotiate -- we will negotiate with the fleet operators so the station is not behind the fence, and to see if we can put the station at an appropriate location that allows scale-up and access to the retail market. I should also add that Bank of America was listed there because we've enlisted them to help create the financial instrument and de-risk it in such a way that third-party money can come to the table.

COMMISSIONER SCOTT: Oh, this is great. Other questions? Okay, thank you so much. Let's

turn to our next panelist, who is also on the phone, which is Cisco DeVries, who is the President and CEO of Renewable Funding. Renewable Funding is a finance company that provides innovative clean energy solutions to governments, utilities, and private sector clients in the United States and internationally.

The firm administers all aspects of energy financing programs, builds technology systems to simplify program and consumer engagement, and delivers capital for energy improvements. Renewable funding has provided services to over 200 state and local governments, including the states of California, Pennsylvania, Hawaii, and many others.

Previously, as the Chief of Staff to the Mayor of Berkeley, he envisioned and led the initial development of the first Property Assessed Clean Energy Program, PACE, which allows property owners to pay for solar installations in energy efficiency projects as a line item on their property tax bill. He also served as an appointee in the Administration of President Bill Clinton, serving as an aid to the U.S. Secretary of Transportation and the U.S. Secretary of

Energy. Welcome, Cisco.

MR. DEVRIES: Thank you very much. Thank you for having me, Commissioners, and for folks getting together on this important issue. It's a real pleasure to join. I understand there was some technical issue and my slides aren't there, so I will run Powerpointless and hopefully it will probably improve my presentation.

You heard a little bit about renewable funding; the goal of our -- what I was requested to talk about today, and I'm pleased to do so, is to talk about lessons learned from a very related area around energy efficiency and clean energy financing, and just hearing Charles before talking about how they built off of a PPA model as they looked at this, I think is a great example. We spend a lot of our time here at Renewable Funding working with states and utilities on how to de-risk third-party money, just as Charles said. We work on a variety of products and services that look for how we get large-scale, low-cost money from the capital markets into the energy efficiency renewable energy space, and through that experience in the last six years have really kind of come to

understand a lot about how to bridge the gap between the need in the market and the scale at which that need is, as well as how to structure and organize in a public/private partnership so that this large-scale, low cost capital can come. And that's really what we're talking about, Property Assessed Clean Energy, or Residential Unsecured Loans, and I'll talk about each of these, or Utility On Bill Financing, or some of the other tools that are here or talked about are all -- and even PPAs which integrate tax credits into Federal tax credits and often State credits and rebates into financing.

So all of these are tools being used to help governmental entities and utilities finance this transition by bringing in this large-scale capital. So that is our approach. And I was going to give some examples and some understanding of how that approach has worked and not worked, as a way to help understand I think a little bit about the task underway, specifically with this effort.

The first example I wanted to give is really related to -- is helping to make this, I think, a little bit more clear to folks who don't

spend their lives in a finance environment. The first thing about financing is that financing is not a demand generator, and it doesn't make people want to do things, it doesn't make building owners want to install projects, whether that's Hydrogen fuel stations, or EV charging stations, or whatever else, nor does financing encourage somebody to put an energy efficiency improvement on their home, which is what I mostly focus on. However, financing is a threshold issue. You need to have financing in place to fulfill demand when it is there. And so I often remind folks that nobody gets up in the morning looking to go finance things, but they do often get up looking to get certain things done for their homes or businesses. And that's where financing comes in, we need to turn these ongoing costs into a service-based approach.

And a good example of where this has worked is in the car industry. We have essentially over the last 30 years eliminated the upfront cost hurdle to buying a car, and we've created an essentially unlimited low cost capital coming from the capital markets to fund car loans. We've integrated those car loans,

integrated the financing seamlessly into a process when you buy your car.

And we have pricing that is specific to auto loan performance, meaning that we're basing the interest rates and the costs of borrowing based on the actual experience with car loans, and not just other consumer debt, in general, or other debt in general.

So we have essentially solved that financing issue and, really, what I try and do, and what we're looking at here, is how to solve the upfront cost hurdle using financial tools for other clean energy and energy efficiency and transportation-related improvements. That's my first sort of point which is on the auto loans, and just understanding how those pieces work.

The second point that I wanted to make, which I think is critically important, is that in our research, both in the commercial sector and in the governmental sector, and in the residential sector, so in pretty much every area, we find that it is very difficult to have property owners or investors or folks make improvements that aren't otherwise needed. So I'll give an example from the housing market.

People don't start off, for the most part, with a notion of getting an energy efficiency improvement. We hope over time that that grows and, of course, a big effort at the CEC is to help develop that market. But most people make an energy efficient improvement because they have another more pressing need that relates to energy, so their HVAC has gone on the fritz, or their car is broken and they're getting a new car. So the financing need comes in because you're solving a problem, there's a problem that a customer, a consumer, a homeowner, a business owner has identified, and financing is a tool to help solve it. So we spend a lot of our work helping to bring folks who are already making decisions, who are at decision moments for other reasons, and help them use financing as a tool to help them make better, more efficient decisions.

And as we look at how to make these infrastructure improvements and these other improvements that we're talking about today, I think it's important to recognize that there are a lot of improvements going on already, and one of the best ways to capture people's attention is to help them solve a problem. So if they're

going to make improvements to something on their building already, how do we help them using financial tools and other incentives to get them to also do something related to this, an EV charging station or otherwise. So that's just a key notion, is it's very difficult to motivate people in whatever sector they're in to do something that they have not identified as a problem, and it's much easier to find a place where they've already identified the problem and you can help them solve it as long as they also help move the agenda that you've set related to efficiency or energy or transportation.

So I'm going to give now a couple of examples quickly about how this has come to pass and as tools that might be helpful for you, one if the so-called WHEEL financing program. This is an effort that started with the State of Pennsylvania where they had a loan program called Keystone Help available to consumers, homeowners in the State of Pennsylvania who were making improvements to their homes that involved energy efficiency, HVAC improvements all the way to home retrofits.

The State of Pennsylvania initially

provided 100 percent of loan capital from its State Treasury to fund this loan program. But quickly the program's success exceeded their ability to fund these loans and they looked for an approach to get out of the business they were in and bring third party capital in to take on the bulk of the financing.

We worked with the State of Pennsylvania and Citigroup among other partners, including NASEO, the National Association of State Energy Officials, whom I'm sure you all are very aware of, to put together a program that both solved that for Pennsylvania, but also was available for other states. The key part here, though, is that we were able to bring large-scale third-party capital, in this case Citigroup, to bring low cost capital in, as long as we set up the program at the beginning, set up the funding, the loans, so that they could accept it. And that was a long collaborative process. At this point we're over 80 percent of the capital for loans that comes from third parties, and states like Pennsylvania provide the other 20 percent in terms of credit enhancement. And that has made their scarce dollars available for these programs

to go a lot further by leveraging financing. That was one example that folks thought would be helpful to share.

The second is another approach which you're familiar with called PACE, Property Assessed Clean Energy, which also works for obviously making EV charging station improvements and other things on commercial properties and residential properties. PACE, Property Assessed Clean Energy, allows cities and counties to set up programs that allow homeowners and business owners to finance energy efficiency renewable energy and other related improvements, water efficiency, on their properties and repay it on their property tax bill. Obviously there has been a long history with PACE and it's in fits and starts, although it is definitely in a growth mode now.

PACE, similar to WHEEL, uses a public/private partnership, although in this case what happens is that the state has enabled a security mechanism, in this case the property tax, to be used as a tool for repayment. And that certainly enhances and provides additional credit for private investors to bring in money.

So today large scale low cost capital from the capital markets is coming into support PACE projects, both at the residential and commercial level, and it was done, again, using a tool where the governmental entities have been able to provide that enhancement. In this case, like I said, it's not cash or dollars invested as it is with WHEEL, in this case it's using another tool of government, the property tax assessment mechanism.

PACE has a lot of interesting viability here, in particular related to the build-out of advanced technology transportation infrastructure because PACE can be used to finance the cost of charging stations and other fueling systems in stations on privately held commercial properties. So there is an interesting opportunity, obviously, for the Commission to look at how to implement AB 8 and to provide PACE as a tool when private sector commercial properties are having installations of these systems, and perhaps there are ways for the Commission to support that, to reduce costs or to make that an easier process for commercial property owners, and I'm sure there are others, as well. So a lot of good

examples from there, but I wanted to make those two examples known because there are two ways in which there are public/private partnerships to deliver financial instruments to solve a public policy challenge.

The last thing I wanted to mention today comes from our work in Hawaii. And we work for the State of Hawaii in a couple of capacities, but part of our work is to support their essentially Green Bank, but it's their Green Infrastructure Authority, a financing program to support energy efficiency and renewable energy projects in the state. And the State of Hawaii has seen a pretty dramatic change in the last few years, just as we have, in terms of the amount of solar that's been deployed and the amount of energy efficiency that's been deployed, such that they're now shutting down and turning off power plants that used to run because of the amount of distributed generation that's in place.

And what we do with Hawaii, again, that public/private partnership, it really looks to take the same kind of capital, this large-scale capital markets capital, take that same capital that was used to build power plants and

distribution facilities for power, and instead use that same capital at the low cost for folks to put solar on the roofs and do efficiency measures in their homes and businesses. And that is all of our goals here, is how to make this transition to better alternatively fueled transportation systems, homes, businesses and the rest. And I would say that a big part of the jobs, and as you guys look at getting this going and getting it to scale over the next coming years is how to move from the test case and from one off projects to a place where it's a standardized approach where large-scale capital can come in, and I think there are some, as I mentioned, some good useful lessons from other spaces, solar PPAs, WHEEL, PACE, what's happening in Hawaii with their funding, and others that can be deployed here, as well.

So I apologize for the mis-queue on the slides, but hopefully this was helpful in setting the stage for some of the broader conversations you're having about how to deploy financial tools and financial instruments as part of AB 8. Thanks for your time.

COMMISSIONER SCOTT: Yes, thank you very

much. This is absolutely helpful and we very much appreciate you taking the time to lay this out for us.

So one question that I have is you talked a little bit about how it's very difficult to have a property owner make an improvement that isn't otherwise needed, and so it sounds like maybe you put together a package of options so that when someone does need to make an improvement, they have -- I don't know what it would be -- is it like a list to choose from? Or how did you kind of take that step from when there is a problem to solve, enticing them to make additional improvements and to know those options are out there for them? Did we lose you? Okay, well, I'll hold that thought.

MR. RHOW: I can actually answer that question.

COMMISSIONER SCOTT: Sure.

MR. RHOW: I'm pretty familiar with PACE myself and I think the question you raise is a very critical question on the PACE front because when you're trying to get the mortgage lender to basically agree to consent to allow this PACE lien to be above his lien or her lien, I'm sorry,

then they're going to want to know exactly what is critical and ranking, you know, what kind of fixtures or projects you're putting in and whether it be a charging station, how that stacks up versus, let's say, a solar or energy efficiency fixture, I think, is part of that sort of screening process that the mortgage lender is really going to want to understand and I think could present a challenge, frankly, in terms of applying PACE because they may say, "Well, I get the energy efficiency stuff, but now you want to put in another charging station, is that really critical?" I think that's the absolute right question that you've raised.

COMMISSIONER SCOTT: I keep thinking about that.

MR. DEVRIES: Can you guys hear me now?

COMMISSIONER SCOTT: Oh, we can, yes.

MR. RHOW: Oh, sorry, Cisco, I didn't mean to –

MR. DEVRIES: No, no, thank you, John. It's great to hear your voice and you were great, and I don't know what happened, but I was sitting here and then I was gone, and now I'm back. Let me answer in two quick ways if that's okay.

COMMISSIONER SCOTT: Sure.

MR. DEVRIES: Adding on to what John said to your question, the first is a lot of what we look to do, and I think John was getting at this, if you come to somebody and say, “Hey, we’d like you to do this big improvement,” you’d like to make this change, but it’s not part of something you had already considered doing, if it’s not solving a problem that you had identified, you’re not going to do it. And it’s very expensive and difficult to essentially incentivize somebody over that hurdle. And so what we look for in our efficiency programs increasingly is how do I capture somebody who is already in a place that needs to make a decision? So how do I bundle certain things together? So if they come in and say, “Well, my HVAC is broken,” and they ask the contractor to get it fixed, they say, “Well, great, but if you get a very good efficient HVAC and I do some air sealing while I’m here, I can get you this great financing.” And so what happens, then, is you’ve captured somebody who is already going to make an improvement and you’ve helped to make it a better improvement.

And the second thing is we recognize that

a lot of improvements that get made aren't necessarily directly tied to energy, but are connected to the project when they're doing it, so we allow for 25 percent of the loan proceeds from our WHEEL program to be used for non-efficiency measures. These can be new wiring or other things that are part of the improvement.

So again, where I think that leaves me with this conversation is, how do you make sure that you're talking to people at a time that they're ready to make a decision, so that they're interested in what you have to say? And how do you give them a product, both them and the contractor that serves them, a financial product that they can use regularly, that can help them do both the project they've identified as a problem, but also help solve your problem? And I think those are the two things that I wanted to sort of say is really to that issue, is it really is a question of motivation and how you set up a financing tool that is not simply reliant on people showing up and saying I'd like to finance this very specific thing that I've never heard of before.

COMMISSIONER DOUGLAS: This is

Commissioner Douglas. This is just a quick follow-up, Cisco. So I'm really familiar with what you're talking about in the efficiency area, and I think that's absolutely the right approach to find ways to approach people and offer them these opportunities at the moment in which they're making a purchasing decision and it's front and center in their minds, so to speak. I guess I'm interested in learning more about how that applies in the area of alternative transportation infrastructure.

With vehicles, maybe it's a little more clear, but infrastructure. So as we have a panel discussion, or as people have thoughts about that, I'd love to hear that.

MR. DEVRIES: I do agree that that is an important conversation and why I wanted to raise it, and I don't certainly have the answer. I would say that as we look at EV charging stations and other infrastructure that are being attached to private commercial buildings or other buildings, capturing them at times of other improvements when they're making other tenant improvements, other improvements to the facility, it's probably easier than capturing people when

they're not planning otherwise to make an improvement. It's just a lot more economical and they're already in the mode where they need contractors to do certain amounts of work. So, you know, I will leave it to the panel and to the rest of you guys to see if this is applicable, but I wanted to make sure, as you well know, and I think most of you are well aware from the issues in efficiency about how this is played out.

MR. RHOW: I can make a comment now or I can wait later. I don't know what the format is. I think Cisco is absolutely right with his stress on bundling, which is what we're seeing now, particularly at the home, but it is also happening in the commercial space and I think when you talk about some of these funding mechanisms, which were really designed to run energy efficiency and how to utilize these mechanisms, the strategy, if you will, in terms of how to fund EV infrastructure is to bundle that. So, you know, a good proof point is what we're seeing in the solar space. For example, SolarCity is heavily marketing a program that they call PVEV and there's a lot of studies that

have been shown that people who put solar panels on their house, they're likely to be EV drivers, and so there's a natural connect there, and particularly if you can approach to be completely off the Grid and know that your charging station itself is being, let's say, powered by solar. So that's a good example of bundling. You know, for these mechanisms to fund on a standalone basis, EV infrastructure I think is a tough sell, so it would have to be bundled.

COMMISSIONER SCOTT: Great. Thank you very much. Let's turn to Reneé Webster-Hawkins. Reneé is the Executive Director of the California Pollution Control Financing Authority, an independent public agency chaired by the State Treasurer, dedicated to steering private capital and public funds towards environmental clean-up projects through conduit bond issuances and other financing mechanisms tailored to specific markets and policy objectives.

Ms. Webster-Hawkins has served as an attorney in both the public and private sectors, including here at the Energy Commission, and as an administrator at several state agencies. In those roles, she has been at the drawing table of

many successful public/private partnerships to advance California's environmental policy goals, including collaborations between Sister-State Agencies. Welcome, Reneé.

MS. WEBSTER-HAWKINS: Thank you, Commissioner Scott, Commissioner Douglas, really nice to see you again. Can you hear me okay? I'm going to be speaking with you today a little bit more on a practical level. I've really appreciated hearing this industry-specific data about the challenges and the needs, and what I'd like to share with you today are some of the very specific and might even seem like bread and butter financing tools that may be able to be brought to the table in this comprehensive strategy towards financing alternative transportation infrastructure. My comments are going to be primarily focused on EV infrastructure because that's what our staff has been engaged in speaking with the Energy Commission staff and others about, but some of the strategies are also applicable to the Hydrogen infrastructure, as well, and I'll note that where it's appropriate.

Just to give you a little bit of an

introduction to the alphabet soup that I come from, CPCFA, we were established in the ‘70s to be a conduit bond issuer, primarily for private activity bonds that are tax-exempt in the wastewater, solid waste and water furnishing facilities space. So we issue millions and sometimes billions of dollars of bonds each year for those kinds of projects statewide.

And since that time we’ve also developed niches in other environmental projects. We provide grants and loans, some which are funded from our own revenue, and other grants under Proposition 1C for assessments and remediation for Brownfields and Infield development in California. And then also since 1994, we have had the authority to run small business lending programs. And so what’s distinct about that is it doesn’t have to be an environmentally focused small business program, or business to benefit from our small business lending programs, but we like them to.

So since 1994, we have been issuing and administering a bread and butter loan loss reserve program that’s very familiar to lenders of all sizes, and we are proud of our program

because it's quite nimble. For any of you that have had any experience with the Federal Small Business Lending Programs, we're just proud to say that the lenders we work with really like our program, and have designed it intentionally to be less burdensome while maintaining the oversight and prudence that we need to keep track of the public funds, but we design it also intentionally to be very efficient not only for the lenders, but for the small businesses that take advantage of that program.

So we've touched on in the conversations today a number of different public financing options and certainly rebates, grants and direct loans have been mentioned, I'm not going to cover those today, but I'd like to talk to you more about some of our more tailored options that we have administered, or could easily administer.

And keep it in mind that I'd like you to think of these as sort of a mix and match list of options; they can be tailored. And I'll show you some examples of how we've done that in some environmental programs and so that, depending on the objective to be achieved, the amount of money to be dedicated to these efforts, you can mix and

match these options to try to best achieve the goals that we're talking about here today.

Just by way of an example, the CalCAP Program, which is our Loan Loss Reserve program, it has seen tremendous performance over the years. Cumulatively, our lenders have lent over $2.4 billion directly supported by our Loan Loss Reserve program, and these are all to small businesses in California. And one of the things that we're most proud of is that, in California, the way that our CalCAP program is designed, it stands alone compared to other CAP programs in other states. We're very well suited to microloans and we define microloans as those less than $40,000. So you can see just from our last year's stats alone, nearly half of our loans were loans indeed to microloans, so small businesses, sole proprietorships, mom and pops, and I think that's instructive here where if, especially if we're talking in the EV space and we're talking about some sort of incentive designed to small businesses or hosts of small charging stations, this kind of model could be well-suited and easy to administer.

Also just as a quick overview, and I'm

providing a lot of this information for you if you want to consult it later from the slides on the website, but just to underscore that a Loan Loss Reserve is not a direct loan. The lender maintains the primary underwriting role for all the loan, and so the risk assessment is that of the lender's. We have a simple loan enrollment process, a simple set of both criteria for the lender eligibility, as well as what kind of businesses are eligible to receive the loan loss reserve contribution.

Typically, the CalCAP Program requires a Lender contribution, a Borrower contribution, and then our State contribution matches the combination, the total of the Lender and the Borrower contribution. And then all of that money goes into the Loan Loss Reserve Fund and sits as a pooled insurance fund against that lender's portfolio of loans that they've enrolled in our program.

And this is just a graphic to show again how we think how easy our process is, it's quick, the enrollment form to our agency is just two pages, and we're generally able to turn our approvals around within a matter of a week or so.

And some examples of how we've both used the CalCAP model and tailored it in a couple of different environmental contexts. So our basic small business program is the one at the top, and we've listed that there's a Lender and a Borrower premium, just as I just described; in that case, for instance, let's say the Lender decided to contribute two percent of the loan amount, the Borrower would contribute the same, and then we would contribute four percent for a total of eight percent of the loan in the Loan Loss Reserve Fund to insure against that loan.

We administer on behalf of ARB over $54 million of their AQIP funding for the purpose of assisting small truck owner and operators with coming into compliance with the truck and bus regulations that ARB administers, and we've been doing that in earnest since 2009. Obviously, we've been seeing an uptick this year with the enforcement of those rules coming into play. You can see there we have, according to both the regulatory imperative faced by those consumers, as well as the borrower profile which assumes that they're on the riskier end of a Borrower's profile, as well as not having the access to the

funds perhaps to make the upfront fees for the CalCAP Program. So in this case, we've tailored it so that the ARB funds pays the entire contribution, the Lender doesn't, the Borrower doesn't, it's the ARB funds that pay the entire contribution to insure against those loans.

Again, we have another smaller program we partner with on behalf of CalRecycle to back similar loans for eligible recycling projects, and there's a typically structured lender and borrower and state match for that program.

So the trade-offs of a Loan Loss Reserve Program for EVSEs, so you can see from the stats that I provided you from 2013 that the private/public leverage ratio is, I think impressive, 5:1 to 10:1, depending on the contribution terms of the program. Recapture is slower if we're talking about a program in which we hope to recapture some of the public funds under optimum performance of the loan or the lease, it's slower because in most of our CalCAP Programs, we let the Lender set the term of the loans, and so they can be anywhere between three and 10 years. So the recapture is slower, but the leverage is great. The benefits are that

Loan Loss Reserves are easy, the structure is well understood by Lenders, it is most attractive to Lenders if the amount of funding available in the program is either significant or enduring, the ARB Program is an example of that, both significant and annually refreshed funding so far. So that encourages Lenders to realize the benefit of a volume-driven portfolio of loans or leases in that area, and it helps them spread the risk, especially when you're talking about a small business type or a business profile that is riskier.

So depending on the size of the funding to put towards any kind of pilot project, it might only benefit one or two Lenders who are really willing to enter into that space until the hope of future funding or subsidies is available. A benefit is it's easily replicable and a trade-off is that, again, there's no incentive for the Borrower for earlier pay-off because, again, the Lender set the term, the Borrower really doesn't receive a direct benefit in the sense up front they do because they receive better loan terms than they might otherwise if they are, in fact, a riskier borrower. But in terms of payoff, timely

payoff is their incentive, there's no added incentive to increase the State's recapture.

Collateral Support is another kind of program that we run that's more suited for loans of a larger amount, the minimum loan amount that we accept right now is $100,000 per project, the loans can be a maximum of up to $20 million, and what a collateral support does different than a loan loss reserve, it's an individual contribution per loan, so it's not a pooled approach; however, what the State does is it provides the Lender cash support for qualified loans that the Lender can hold on deposit in their institution during the term of the loan, and it's designed again to defray the risk the Lender might experience associated with an otherwise solid business plan where there is a lack of sufficient capital. So it's ideally suited for either new or expansion businesses or business plans where the Borrower doesn't have the collateral to secure the loan.

We offer it very frequently in situations where there are either SBA or USDA loans, loan guarantees for projects; because our product is ideally suited as a bridge loan, we incentivize

it through our fees for rapid pay-off, so that both incentivizes the Lender and the Borrower to set aggressive loan terms. And an example of how the collateral support works is, for instance, let's say you have a million dollar project, you come in for a million dollar loan, you don't have the collateral support, we can provide up to 40 percent of that million dollar total loan amount to the Lender to hold on account during the term of the loan. They can get an additional 10 percent if the project or the Borrower is located in an area of high unemployment, and then there's an annual recapture. So if the loan exceeds 12 months, we recapture on a prorated basis the collateral support back into the State funds to recycle into similar projects.

We provided a substantial collateral support to the Clean World U.C. Davis Anaerobic Digester that just celebrated its ribbon cutting yesterday, that I know the Energy Commission was a big supporter of, as well, and our collateral support went to the construction loan pending the approval of the USDA loan guarantee that that facility will enjoy. So it's both aggressive, it meets the Lender's uncertainty, especially in the

area of lack of collateral, and it can be tailored to the type of business and the type of risk. This is just an indication of how the fees are graduated, so it incentivizes aggressive pay-off.

So the public/private ratio is 5:1, the recapture can be quick. It would be good for larger project proponents with plans, so in this case if you have either a deployment packager or an entity with broad contact and prospects in the business community for installations, this kind of loan would be good for that packager, or that intermediary, that master contractor, if you will, that's going to be leading the path and facilitating the installation and maintenance of charging stations at numbers of sites. It's ideally designed to support working capital, inventory, business start-up costs, it's easily replicable, easy for us to administer. One drawback is that this product cannot be used to support the making of loans, so it couldn't be a loan to either a Lender, or an investor, or an entity who in turn would make leases or loans to other entities, to small businesses, unless this particular loan was, again, for the working

capital, the non-loan making working capital, of that entity.

COMMISSIONER SCOTT: And Reneé, I just want to do a quick time check to make sure that we have enough time for John to give his presentation, and then hopefully a few minutes for you all to either ask each other questions, or for us to do a little --

MS. WEBSTER-HAWKINS: Absolutely. So we have -- loan participation is just a twist on Loan Loss Reserve, it's actually direct lending, but it's where the State and a private agency or a private entity would agree to invests together in loans. And ideally here the State would take the first loss position, again giving the private Lender and Investor some comfort in any risk associated with the portfolio of loans. We find that a loan participation program works well where there's a possibility of selling the bundle of loans in the secondary market such as in a PACE Program or other established asset class and, again, this is well designed to accelerate the recapture of public funds.

We also could set up a Debt Service Fund and this would be more straightforward where it's

similar to a Loan Loss Reserve, with the exception that a Loan Loss Reserve is tapped by the Lender after the loan has gone into default and the Lender has charged off the loan off its books according to its own charge-off policies. What a Debt Service Fund could do is it could be set up to defray either the costs or the actual payments in the event that a Borrower skipped a couple of payments. So in this context where utilization rate may be directly related to a Borrower or a host's ability to pay the monthly payments of a lease or a loan, especially in the early term when they're attempting to reach their optimum utilization rate, a Debt Service Fund could be very attractive to both the Lender and the Borrower to keep the Borrower's credit intact and also to keep the Lender comforted that they have the funds available and to keep that loan or lease from going in default. Easy to administer and, again, very straightforward, much like the Loan Loss Reserve, except it wouldn't need the trigger of the default of the charge-off.

And then lastly, this is sort of a twist on a rebate program. I take to heart John Butler's comments about rebate programs may be in

the EV Charging market, we're there, especially if the goal is sort of first come first serve, and let's get the charging stations, those hosts that see the need and that are ready to take the leap. However, this kind of model could also help to direct a rebate in a more strategic way where there's also some strategic goals that the state would like to achieve. It could be, for instance, some regional placement to ensure a deliberate network in major transportation corridors, it also could be in areas where the utilization rate -- the optimum utilization rate would not be what it would be expected to be, say, in the Bay Area, or is spotty at best, cannot be predicted. And this model, it's sort of a mix and match of what we talked about above, it's just to show that there are a host of financing mechanisms, which I believe could be easily tailored and easily administered. And because CPCFA has had experience in this area and our statutory authority allows us to have this kind of flexibility, we're happy to look forward to any kind of partnership or assistance that we can provide the Commission in achieving its goals in the infrastructure deployment. That's it.

COMMISSIONER SCOTT: Thank you very much. This is very thorough. I appreciate the good walk-through of the different types of mechanisms and sort of what the pros and cons of some of them will be. I'm going to hold my questions and turn right to John.

John Rhow is the Senior Portfolio Advisor to Kleiner Perkins, focusing on renewable and clean energy financing alternatives for the firm's clean tech portfolio. He has structured innovative finance plans for solar, wind and geothermal projects, which involved the monetization of available federal tax credits. Recently, he has been active in developing financial projects to support Kleiner's investments in the electric vehicle and electric vehicle infrastructure markets.

Prior to this, John served as the Senior Vice President for Barclay's Public Utility practice on the West Coast, working for both public and private sector clients across the country. John possesses a unique understanding of developer driven infrastructure financing as he began his investment banking career at Goldman Sachs, advising Fortune 500 companies on debt and

hybrid equity capital raising and public finance. John has led efforts in identifying financing solutions related to Property Assessed Clean Energy, PACE, Utility On-Bill financing, and Energy Services Agreement Programs throughout the U.S. John is a graduate of Harvard University. Welcome.

MR. RHOW: Thank you. Thank you, Commissioner Scott. And it's a pleasure to participate in this forum. I think sometimes the advantages of being last is to really demonstrate and highlight, frankly, the consistency of the themes that you're hearing, words like public-private partnership, the need for financing to accelerate adoption. The downside, of course, is that I may sound repetitive in a little bit of my presentation, so I'll try to be very brief. It's hard to follow Reneé because I think Reneé has done a very thorough job, frankly, in researching potential financing solutions for the EVSE space, and you'll see that some of the recommendations I have reflect the programs that she's outlined and I think, you know, from my perspective, a collaboration with CPCFA and STO, to the extent that there is a sort of understanding of the

general philosophy of a public-private partnership, I think, would be effective because I think there needs to be a bridge, if you will, between the State and the financing banking community, and I think Renee and her team are well-suited to serve as that conduit.

Now, the perspective I want to take, frankly, is to talk a little bit –- or contextualize, if you will, the need for a public private partnership, the need to move away from a grant type of model, or what I call a Full Subsidization model, and attracting Private Sector Capital. But philosophically why this makes sense from a policy standpoint because I've structured a lot of what I call PPPs or Public Private Partnerships, and there needs to be sort of an alignment of what the policy objectives are of the government or entity, and identification of where the market is and what gaps there are in the market, and where the public government can serve to fill these gaps, if you will, to basically get to -- and I've heard this before -- a steady state, long term, sustainable model that does not need or rely upon government subsidies because, of course, the subsidy well dries up

eventually. And I think the CEC really has the opportunity here to unlock what I would describe as billions of dollars of global capital in this sector and really accelerate deployment in the state and frankly leverage off the success it's achieved in really turbo charging this industry. And this goes to my next slide, which frankly talks to the success the state has had in meeting its goals for EV adoption. It's been the poster child across the U.S. and, speaking to other states such as New York and Connecticut, there's sort of this urgency to catch up very quickly to what the state has done.

I think it's important to note that a lot of industry projections of EV penetration, there's this sort of magical number of 2.5 percent of light-duty vehicles, my understanding is that this past year we surpassed that here in the state, so that is a tremendous achievement, again, for the state and, again, what the CEC and other entities have done to stimulate adoption of EV cars throughout the state.

But the Governor has set a very high hurdle -- 1.5 million ZEVs by 2025. And if you look at the bottom graphic, what we've been

seeing is that the growth of cars now has really picked up significantly, but the ports, which is the bars on the bottom, or what I describe as "public ports" which obviously solves the range anxiety issue, is lagging. And what we're seeing is a widening and widening in infrastructure gap. And based on sort of our projections, and I know this is highly based in assumptions, but when we think about kind of where the state needs to be in terms of public infrastructure over the next five to 10 years, and you sort of incorporate current market estimates of station price, etc., you know, you're looking at anywhere from a $500 million to a $2 billion capital requirement to sort of catch up and meet the needs of EV drivers, and keep up, if you will, with the pace of adoption.

Clearly, a full subsidization grant model cannot solve this problem on its own. But it was very effective in the early stages of what I described as a very nascent industry. And I've seen this in other sectors such as solar and others. You need that full sort of subsidization, if you will, to kind of pull the private sector, particularly customers, to

understanding the value proposition of the technology. So that's been done very successful. The challenge sometimes with full subsidization, and this is what I've seen in some of Kleiner Perkins' portfolio companies in terms of how they compare versus maybe some of their competitors, is that in this space when the Federal Government had the DOE grant and they were basically giving away chargers for free, there were -- thankfully we did invest in some of these companies -- but there was basically companies that based their whole model on a grant sort of give it away for free type of business strategy. And what ended up happening and we saw was, when you don't get the private sector's skin in the game, they end up putting these stations in what I call "ceremonial sites" that don't really maximize utilization. And that's very important.

So you need to find a way to kind of -- and again, this is the idea of a public-private partnership is, if you're giving the money to the private sector, you need to create the proper incentives and behavior to make sure that they're using that capital appropriately.

Now, we believe at Kleiner that we're at

a sort of inflexion point in the industry where there's a lot of customers, particularly in the state, who have received the chargers, both on the municipal and the private sector side, have seen the benefits of providing charging, and are ready to what we say lean forward and move to what we call the scale phase.

What we've seen in other clean tech sectors is that when you try to move to that scale growth phase, financing is sort of the solution because a lot of these customers have very limited capital budgets. The challenge is, while there is a big pool of capital of what I call "infrastructure and transportation investors" here in the U.S. and across the world, and this is the "but" here at the last bullet point, station utilization and revenue risk, which is really when you think about the cash flow that is being generated by these assets, is very uncertain. And I think hopefully there's a consensus agreement that this is probably the biggest risk, if you want to own stations, to get your arms around. And that is frankly the gap that we're facing now to secure what I call meaningful amounts of capital, cheap capital from

the private sector. And that is why I think it fits very well the model of public-private partnership because the State or the government has a policy goal and the recognition of EV infrastructure, but the State's investment horizon by virtue of its policy goal, and by virtue of the fact that it is a state, is not subject to the vagaries of the short-term market forces, but can take a longer term horizon view from an investment perspective.

And so you have this private sector now who is willing to lean forward and this utilization risk is the big nut, and it's a nut not only for what I call site hosts who just outright buy the stations, and the reason why it's hard for them is because these site hosts, as you know, have very strict payback periods, or what I call return on investment paradigms. When you have utilization risk, it's hard to argue to your CFO, "let's buy the station," when you're not really sure if the cars will show up and how much you can charge and what the cash flow looks like in terms of recovering your capital investment.

Obviously we talked about cities, they

want to attract businesses, but they have to manage their budget and they like to see revenue offsets when they make capital budget allocations. And the same obviously goes for investors. If you're an infrastructure investor, what you're used to seeing in a solar deal, for example, is like a Power Purchase Agreement where you know and definitely know that this, by virtue of this Power Purchase Agreement, these amount of electrons will be generated on this roof, and these electrons are worth "X". And so the multiplication of those two means "Y" which is my cash flow per year.

So again, at the risk of sounding redundant, I guess I just want to say that from a policy standpoint, I believe how the state should think about the role they can play, capitalize on what I call utilization risk. And the way the construct that I think this could work, and this fits very nicely with what Reneé talked about, would be a way where you can use the AB 118 dollars effectively as a loan, not as a grant anymore, but you lend it. But the repayment of that loan is tied to future station utilization revenues. And obviously this not only leverages

your dollars, but frankly creates a return, a potential for return, because if the cars show up, then by definition the utilization goes up, your cash flow goes up, the returns go up on behalf of the state, and that money can obviously be redeployed now into the program and recycled, so now you have a revolving loan type of program.

And so we talked about -- I don't want to go into a lot of detail -- some of the structures that can work in terms of how this type of funding mechanism, or utilization funding mechanism can work, Renée covered it, the first bullet point, upfront funding for the site owner, that's basically the direct subsidy that Renée talked about. You can either lower your upfront costs if they do a lease or a loan, basically you can use the money to either lower the lease payment, or maybe what you do is you cover the first two payments in a five-year lease because the station owner may say, "Well, cars may not show up, but I really think cars will show up in year three." So that's a good role for the state to play, that's the direct subsidy.

The second is what I think Renée talked about, and again these are all I think pretty

much the same type of programs that the CPCFA offers, subordinate debt basically which I want to drill into the next slide, is that basically direct loan concept, which has frankly gone viral in other states. And it's funny because the State of California, I know because I have done banking here in California for years and have called it a state, this concept actually was fostered originally in the state at STO's office, but the New York Green Bank and a Connecticut Bank, they're doing a great job of executing frankly on that framework, and this framework I'm showing you here is sort of what we've seen frankly done, and Cisco talked about it in other programs that we're seeing such as the Pennsylvania WHEEL Program and others, but I think could serve as the model here for EVSE.

So the way it would work is you use the AB 118 dollars to cover some percentage of the upfront costs. I put 20 percent, 80/20, that's a 4:1 leverage, I think it depends on the vertical, in other words, if it's a workplace versus let's say an MDU, I suspect the MDU, for example, that installation component of the MDU is much higher and is a bigger nut to solve for, so that 20

percent may need to flex up a little bit. But let's assume, for example, what I call a 20/80 or 4:1 match model, they provide a loan of 20 percent, the private sector, whether it be the host or the lender or the developer, basically provides the balance of the upfront installed costs, and the repayment mechanism for the AB 118 loan portion is what I call basically a transaction fee, if you will, that can be either flat or variable, so it could be let's say flat, every time a driver uses that station, 25 cents per hour, or it can be variable, 10 percent of whatever the fee or pricing of that station is collected.

Now that fee itself would be collected by a network provider, so again the assumption here is that the stations are on a network, that network provider would take that money or transaction fee and deposit it into a State account. The STO, I would assume, or CPCFA, would set what I call a target IRR, say "we want to achieve this percentage return over this period of time." And once that target IRR is achieved, there should be, we believe, some incentive that basically allows for now either

that transaction fee sort of steps down, or maybe there's some sort of sharing with that side host or private sector, or lender, again kind of aligns the incentive with the State to maximize utilization.

But the point here is that the funds now are recyclable because now you're actually collecting money from these transaction fees, which can be redeployed back into the program. It aligns perfectly with your State policy because the policy here is to grow EV infrastructure in cars, and so you should benefit economically as your policy is achieved.

So I'll conclude by saying that, just to reiterate what others have said, that the PPP approach we think is the right sort of solution. We think it addresses the largest hurdle currently. We think it should be structured to address the largest hurdle in the EVSE space, which is utilization risk. The beauty of this, particularly this what I call the subordinate capital, or direct loan model, is that it can be plugged and played into different verticals. And I look forward to collaborating with the State as to how that could fit for, let's say, the MuD or

Multi-Family, or workplace, or city space. And again, as I said, it's been proven in other states, but frankly the invention of it, or the technology or thinking has been in the state for years. That's it. Does anybody have any questions?

COMMISSIONER SCOTT: Wow, thank you. That was an excellent presentation. I do actually have lots of questions, but maybe what I might like to do is see if -- so we're just a touch over time and maybe if folks have another five to seven minutes, we'll go up to about 12:25 and I'd like to invite some of our program staff to also kind of join in the discussion if things have sparked in your minds that you have specific questions about, "Hey, maybe this can apply to the biofuel space," "maybe this applies to what we're trying to do with advanced to medium- and heavy-duty." So I invite you to think about that, as well. And also, if you all have heard things that -- I liked, John, how you kind of said, "Oh, and we talked about this and it reminded me of that," if you have ideas or questions that you'd like to ask each other, I'd invite you to do that, too. And then I'll hold

some of mine. And hopefully we still have Cisco and Charlie on the phone. Well, all right, I can get us started.

So one of the questions I have, especially with the EV infrastructure is I'm thinking about what Charlie presented from Massachusetts and the way that we're basically sort of marrying how much use, and you can do that easily because of a fleet, with how much fuel you think you're going to need; and how do we get that kind of utilization rate information in the EV charging space?

MR. RHOW: I could take a quick stab at the question, it's something I wrestle with. If I understand the essence of your question, how can we effectively create some certainty, if you will, on the utilization rate? And I think that is -- it can be challenging in certain sectors, it can be applicable in other sectors. So I think fleet is a good example where utilization certainty is achievable because there is some sort of predictable pattern of driving. I think in the MDU space, for example, there could be some potential predictability of utilization. And the beauty of it is, if you can get to some

sort of predictability of what that utilization is, then that opens the floodgates in terms of getting financiers and lenders comfortable, and also allows you frankly to now think about frankly like a Power Purchase type of agreement, which as we know in solar has been very successful.

COMMISSIONER DOUGLAS: So, you know, you did cover this, but I'll ask if maybe you could expand in a little more detail on it, the issue of helping fund or helping subsidize station operations has always been a challenging one for me because, as you point out, it reduces the private sector incentive potentially to have the site in a good place where it will be more likely to be utilized and at the same time it's an important thing to do in order to ensure that we have stations we need so that we can get vehicles that we want to get. And so I'm interested in your thoughts about how we capture the benefits we're trying to capture by doing that, but also how we ensure as much as possible that the private sector incentives are aligned with the goal of having the stations in a place where they will be utilized as much as possible. So really

it could be for anyone, but since you raised it, if you could start?

MR. RHOW: I'm happy to chime in, but at the risk of -- I'll let others try to take a crack, but I do have a few on that question.

COMMISSIONER DOUGLAS: Uh-huh.

MR. ECKERLE: If I could step in, I mean, one thing we mentioned in the presentation, I think it applies in both EV and Hydrogen, is making sure that the incentives and the subsidization of operation and maintenance is always less attractive than selling the fuel, and so I think that's the challenge to keep in mind, and I don't have the perfect solution because it's hard to figure out what the market is going to do, and I would encourage the panelists here because they've spent much more of their career on financing, so to think through strategies and make sure those incentives are aligned. But I think that's the key thing to drive towards.

MS. WEBSTER-HAWKINS: And I just might add, too, that to address that question it may be attempting two different kind of pilot projects because it may well be that one financing structure may work freely and fluidly in getting

private capital into the market, especially in regions where utilization rate will be much more certain, as John mentioned, whether it's fleets or in areas with free and fast HOV lanes, where we know that there's demonstrated pent up demand due to demographics of the vehicles that we already know. On the other hand, from the State's perspective, there may be some deliberate reasons to encourage site placements in places where optimum utilization rate will not occur for many years, if not for a long time, you know, Bill and Cathy's Diner on I-5 may not ever achieve the kind of throughput that the Nut Tree might achieve. But that doesn't mean that the state may not have a reason to subsidize that placement and so in stressing the mix and match approach to financing, I think that it would look very different structuring a financing package that would both keep a lender comfortable in that financing, but also getting the skin in the game, but also right-sizing the government's interest in sticking our neck out and putting that site in. So I would encourage keeping an open mind towards more than one approach to achieve both goals.

MR. RHOW: I actually don't have much to add, really, to the two comments. I think that's well said.

COMMISSIONER SCOTT: Any thoughts from the folks on the phone?

MR. MYERS: This is Charlie. I was going to agree with that. I was also going to make a comment, that I don't think one size station necessarily fits all the areas that might be used and the diner example might be a small station compared to a larger one only because of the remote demand around it.

The other observation that we're making as we have the fleet discussions is that not all fleets are necessarily ripe for this, the driving pattern has to allow that they're in an area that they would be serviced by the particular station the fleet is signed up for the Hydrogen Purchase Agreement on. So one of the things that we're also working on is the shared use so that multiple fleets can go to a series of stations, but all part of a Hydrogen Purchase Agreement from the capital perspective.

COMMISSIONER SCOTT: Great. Well, recognizing that we've run a little bit past

time, we've got the Panel 1 up here, but really what we were talking about was exploring some of the financial instruments that were provided for in AB 8, so it wasn't just focused on the Electric Vehicle charging network. And really, this was just such a high caliber panel, we got a lot of really good information, good insights, and great ideas. To the extent that you have papers or reports or, Cisco, we'll make sure to get your slides that you could send to us to help flesh out and give us more detail to work with on these ideas, we would love to have that. And so I just want to thank also John Butler and David Greene for framing the day very well for us, and then thank Tyson and Charlie and Cisco and Reneé and John, thanks for a terrific morning discussion. (Applause)

So if you would please come back at 1:25 after lunch, we'll get started again at 1:25.

(Recess at 12:27 p.m.)

(Reconvene at 1:31 p.m.)

MS. RAITT: Okay, good afternoon. We'll go ahead and get started again on the second part of the workshop. And I just want to remind folks that we're going to have a panel and, then, after

the panel, we'll open it up for public comments and if you're interested in the room to make comments, go ahead and give me your blue card. And for folks on WebEx, you can use your chat function to let the WebEx Coordinator know that you have a question. And also, I just want to let folks know who are in the room that we didn't have very many hard copies of the presentations, but they are all posted on the Web. So that's it, thanks.

COMMISSIONER SCOTT: Well, welcome back everybody. We wanted to go ahead and jump right in because we are fortunate enough to have with us Sunita Satyapal from the U.S. Department of Energy, but she is on East Coast time and also on a timeline, so we wanted to make sure we had a chance to hear her full presentation and ask a couple questions.

But let me do the introduction. Sunita is the Director of the Fuel Cell Technologies Office in the Office of Energy Efficiency and Renewable Energy at the Department of Energy. In this capacity, she is responsible for the Office's overall strategy and execution, including oversight and coordination of

approximately $100 million in research development, demonstration and deployment activities related to Hydrogen and Fuel Cells. So, Sunita, welcome. Thank you for giving a presentation today.

MS. SATYAPAL: Sure. Thank you. Can you hear me okay?

COMMISSIONER SCOTT: Yes.

MS. SATYAPAL: Okay, great. So thanks again to Commissioner Scott and colleagues for the invitation to give an overview of DOE activities. And if we go to the next slide, now, to put the Hydrogen and Fuel Cell activities within the context of DOE, we're under the Sustainable Transportation Office within EERE, which is Energy Efficiency and Renewable Energy, which is about $1.9 billion per year. And under Sustainable Transportation, we have my office that covers Hydrogen and Fuel Cells mostly for transportation, but we also include stationary power, the Vehicles Office, which covers EVs, a lot of the battery R&D, Advanced Combustion, light weighting, and then the Bioenergy Technologies Office, which focuses on Biofuels. But we're all aligned, focused on meeting the

National Energy Goals and the President's Climate Action Plan. You can see major focus on oil production and greenhouse gas emissions reduction.

And if we go to the next slide, that summarizes the Fuel Cell Technologies Office. Our mission is really to enable widespread commercialization of Hydrogen and Fuel Cell technologies, we focus on R&D, most of the funding roughly on the order of $100 million per year is on R&D, but I'll cover specific examples where I think we're very interested in leveraging the great state activities that are going on in California.

And the two main areas, if you look at the white boxes in the diagram, are the Hydrogen piece and then the Fuel Cell piece. And we have cross-cutting areas, Safety Codes and Standards and so forth. And we have a number of very specific targets and metrics in the program such as the cost of Fuel Cells, durability, and so forth. And those help to guide the R&D. And on the next slide, I have kind of a summary of all of the office activities on one slide, and again the main focus is R&D. And there's a lot of

detail here, but the two main points I wanted to cover are that we've made huge progress in terms of cost reductions, so we typically fund industry, National Labs, Universities to focus on the R&D, and you can see more than 50 percent cost reduction in Fuel Cell, and then the bottom figure, 80 percent cost reduction actually in the last decade on Electrolyzers for Hydrogen production.

So we spent at DOE more than $2 billion actually just in Hydrogen and Fuel Cells in the last decade, and then the middle box shows some of the demonstration and what we call technology validation activities.

And I want to emphasize that California has been a really strong partner, we've worked closely with the California Fuel Cell Partnership, and of course with the agencies, the CARB, South Coast Air Quality District. And the main one I wanted to highlight is the demo that we did with 180 Fuel Cell Vehicles, 25 stations, lots of real world driving, 3.5 million miles, and you can see a lot of the data that we've been collecting demonstrating these early vehicles. Now we have a second generation program just

underway to continue collecting data from Fuel Cell Vehicles, and then finally the last box shows some of the more recent deployment activities, especially through the Recovery Act where we were able to cost share not just early demonstrations, but deployments, especially in niche markets such as forklifts and backup power, and basically bundling demand so we can pave the way for Hydrogen infrastructure and greater cost reduction, paving the way for Fuel Cell Vehicles.

And that's kind of a summary, and feel free if anyone has questions to stop me. But the next slide was going to just give you an idea of the budget and where we're focusing the main priorities for next year, a pretty stable budget, again, the main focus is R&D, the first two lines, Fuel Cells and Hydrogen, and then I think various, of most interest with leveraging State activities are technology validation, Codes and Standards, market transformation, so on the order of about $16 to 20 million that are relevant to deployment activities.

And I will of course make these slides available, so I won't go through every single line here, but it gives you an idea of some of

the main priorities. And then on the next slide, I thought it might be helpful to go over some very specific funding opportunities that we have available in 2014, again, three main funding opportunities which we're in the process of making selections now, so hopefully we'll make announcements soon. But again, hydrogen production, continue to reduce the cost of hydrogen and look at innovative approaches that are focused on low total greenhouse gas emissions, and then hydrogen delivery, that's still a major challenge, especially at the stations, so issues such as compression, and storage, and dispensing, and we have a couple of topics there.

And then in Hydrogen Storage, we're focused on reducing the cost of storing the Hydrogen on board the vehicle, so either high pressure tanks, or longer term technologies such as material and the Forecourt, or in other words, at the station, Hydrogen Storage.

And then finally, we did already make announcements of awards for that last category, Technology Validation and Market Transformation, with about $7 million that we just announced

recently and we're in the process of making the awards in those topics shown there.

And I thought, if you go to the next slide, two possible areas of interest would be related to the vehicles long term, are these two new awards -- we're still in the process of making the awards, we announced the selections, but we're still negotiating the scope of work and the funding, so these are the plans. And we had FedEx and essentially UPS interested in Fuel Cell Range Extenders for Parcel Delivery Vans, so we're again looking at niche markets to help drive the volume for hydrogen infrastructure and then also help demonstrate fuel cell technology and drive down the cost and pave the way for light-duty vehicles. And the second one, the first one is probably going to be in Tennessee and we also had a Fuel Cell project at airports for baggage tow tractors, also in Memphis with FedEx. And then the second one is most probably going to be in Sacramento, so there are I think good opportunities there with collaboration with California.

And then I think the next slide gives you a flavor of some additional funding

opportunities. We do have a Small Business, an SBIR, Small Business Innovative Research funding opportunity announcement that comes out every year. We typically have a Phase I project call and we have various offices within DOE, the first one shown is going to be a little bit more basic science, the second one, Energy Efficiency and Renewable Energy, is probably more applicable to vehicles, whether EVs or Fuel Cell Vehicles or Biofuels. And typically the Phase I is pretty small, it's an exploratory project, about $150K usually, and we have one for example now that's looking at innovative approaches for, again, niche markets such as garbage delivery or pick-up trucks, so again they vary as to the location.

And then Phase II is usually about $1 million, the minimum $1 to $1.5 million, and typically if the recipient gets the Phase I project and they demonstrate some feasibility, then they're eligible to apply for Phase II. And so these come out every year. And at the bottom we just show an example, that just in the Fuel Cell Office we've actually gotten quite a few SBIR projects, the $6.5 million, a lot of small projects just, you know, feeding different ideas,

and many of them have gone on to Phase II, so about $20 million there. So, again, these are for small businesses, less than 500 people, there are specific criteria on the website if there's interest.

And the next slide I think also gives you an example of very specific funding opportunity through our office. We plan to release that in May and we have a Notice of Intent already on the website, and this is a new area of interest across EERE and it's called the Incubator, and typically we set aside about five percent of our budget to look at completely different ideas that are off-road maps. Typically when we do funding opportunities, they're very specific, but in this case with the Incubators, and these are just examples shown here, they're not intended to be specific, but I thought the last bullet may be of interest, they're innovative solutions to Hydrogen infrastructure or completely innovative business models, reducing soft costs. This is the first time we're doing something like this. And the other office is, as well, such as solar and wind and so forth, within DOE are doing something similar, but I thought I'd highlight

that in case there's interest.

And the next few slides, I thought we'd cover some other very specific areas where we are coordinating with a number of stakeholders in California on, and one of the critical pieces of infrastructure puzzle is getting the Safety Codes and Standards right, and so we have a lot of activities developing technical information, permitting the stations, testing/metering is an area, we've done a lot on risk mitigation, Sandia National Labs and Lawrence Livermore National Labs are there, and we're doing quite a bit of R&D, so this gives you a high level idea of the types of activities. We've also focused on disseminating best practices and safety information, a lot of activity through the California Fuel Cell Partnership, as well.

And if you go to the next slide, I think that summarizes the approach and the strategy, I know there's a lot on this slide, but the key is really identifying the R&D needs and looking at what the gaps are now; how can we, for example, do the right experiments, look at a quantitative risk assessment, look at what the setback distance is for a Hydrogen Station should be.

That feeds into the R&D that we fund, for example, the actual combustion experiments, the materials compatibility experiments, and that feeds into the information that leads to the Codes and Standards. So, again, there's a lot here that I think would tie in well with what the state is doing with plans for infrastructure. And on the very bottom, I thought I would also highlight some of the training and outreach activities. So far we've trained over 26,000 first responders and Code officials, there are still a lot of lessons learned, I think, that can be shared. And we also launched a mobile app tool, shown on the right, for your iPad or iPhone, again to try to improve the accessibility of information. And we were very happy to hear of the Ombudsman position, and of course we've known Tyson for a while and are happy to coordinate if there's any interest in any of these tools.

And then I think the next slide -- and I know I'm going quickly here, but I thought this would also be of interest to highlight, we've launched a National Fuel Cell Technology Evaluation Center at our National Renewable

Energy Lab in Golden, Colorado. And here the intent is to be able to handle proprietary data now that we have a lot of information from demonstration under real world conditions, we're tracking very specific and critical information like durability and cycle-wise and performance, Fuel Cell or Hydrogen systems. And so NREL compiled the data and there's no attribution to the entity that is submitting the data, and what is presented to the public is what we call Composite Data Products, CDPs, and we've been very successful here, we have hundreds of datasets, and so we thought if that's of interest we have some contact information there. And especially as the stations get up and running, we have just one example shown here where we're tracking maintenance issues, for instance, and you can see the breakdown of what some of the issues were and where they were, so following up the root cause analysis, you know, greater coordination with state activities would definitely be of interest.

And along those lines, the next slide also shows a very specific example where we are establishing capabilities both at the National

Renewable Energy Lab and Sandia National Lab and, of course, right across the street from Sandia, the Lawrence Livermore National Lab, as well, and here the idea is to see what we can do with the Federal activities to help accelerate the Hydrogen infrastructure deployment, and that there's been very specific examples such as refueling protocol, metering, station verification and validation, lessons learned, cost reductions in stations, and so I thought I'd highlight this one other specific example where I think state and federal coordination would be valuable.

And then finally in the next slide I wanted to highlight H_2USA, which is a public-private partnership. Our previous Secretary of Energy launched it along with the major car companies, as well as other stakeholders including the Fuel Cell and Hydrogen Energy Association, the trade association. You can see a lot of the partners here, the American Gas Association, we have over 30 partners now. And the main focus is how we could address the challenge of hydrogen infrastructure. So we've heard from the car companies that they are

planning Fuel Cell Vehicles commercially in California, so we're also looking at what more we can do on the federal side to address those challenges. So there are four working groups that are part of H_2USA and we'd be happy to provide additional information and look forward to close collaboration with California.

And I think the next slide may have just a summary of communication and outreach activities, that's also a very important piece of our work, we have monthly webinars and a number of announcements and you can see the photograph shows when the President went to Sweden last year and had some Fuel Cell demonstrations. So I thought I'd just highlight the activity there. There is a Senate and a House Caucus specifically on Hydrogen and Fuel Cell and activities there, a lot of international activities as well. And I think on the next slide I've highlighted just the newsletter, we do have a monthly newsletter for those that are interested in keeping track of what's happening in the funding opportunity announcements. And I think the final slide, I believe is the final slide coming up, I thought I'd highlight some of the Key Reports and one of

the major events that we have here in the D.C. area this year is going to be the week of June 16th, is their AMR, Annual Merit Review, and we have both our office as well as the Vehicle Technologies Office present all of the projects that are funded by us, we had several hundred, and typically 1,700 people that attend. And so, again, if there's interest that might be a good potential venue for more coordination. And I believe that may be the last slide, but I'd be happy to take any questions.

COMMISSIONER SCOTT: Sunita, thank you so much for this great presentation. I think it kicked off really well and exhibits exactly what we want to do with this afternoon's panel, and it's really just to kind of understand what other folks are working on, let you all know what we're working on, and think through the ways that we can complement each other's programs, share data, share experiences, share lessons learned, and so a couple things that just jumped out at me -- lots of things jumped out at me, actually, but a few that I'll highlight as you were speaking -- is the Federal Express project which was back on Slide 7, and the Energy Commission just funded

yesterday a Center here in California that's going to work also on Fuel Cell Technologies for medium- and heavy-duty? Or just medium-duty delivery vans, which I think is great and so we'll have to be sure to trade information, I think, and knowledge and experience there. You mentioned Tyson, who is the permitting director at the Governor's Office of Business and Economic Development, and the training for the first responders, and for the teachers, and so I think there are probably some great models or information or lessons there that he might want to build on, and I know he's very interested in that kind of thing, too. And then the app, I've got to figure out how to download the app so I can see what information is there. So I didn't have any specific questions. I don't know if my fellow Commissioner or maybe one of the staff, because Sunita does have to go to something else. Or one of the fellow panelists before she drops off. Okay, well, thank you.

MS. SATYAPAL: And I can stay until 5:15.

COMMISSIONER SCOTT: Oh, you can stay until 5:15?

MS. SATYAPAL: Yes.

COMMISSIONER SCOTT: Okay, excellent. Well, I'm glad to hear that. Thank you so much for joining us and your informative presentation.

MS. SATYAPAL: Sure. And I think there are a lot of backup slides also, so I mentioned other things like the H Prize and so feel free to provide the entire slide deck.

COMMISSIONER SCOTT: Great. Thank you, Sunita.

MS. SATYAPAL: Sure.

COMMISSIONER SCOTT: Let's turn now to Penny McDaniel. She is from the U.S. Environmental Protection Agency and is an Environmental Scientist at the U.S. Environmental Protection Agency's Pacific Southwest Office in San Francisco. Ms. McDaniel currently serves as the EPA Region 9 lead for the West Coast Collaborative, a public-private partnership to reduce diesel and greenhouse gas emissions in West Coast States and the Pacific Island Territories. Penny also co-leads EPA's Office of International and Tribal Affairs, Asia Pacific Port Sustainability Program. Prior to her position with the Collaborative, she worked at EPA's headquarters in Washington, D.C. on

systems-based climate change analysis, renewable energy development, and green remediation. Penny created and launched EPA's "Repowering America's Land Initiative" for the implementation of renewable energy generation facilities on impaired land, and also developed EPA's Clean-Up Clean Air Program in Region 9, which led to the establishment of green remediation policies and practices in EPA Regions throughout the nation. Welcome, Penny.

MS. MCDANIEL: Thank you very much. Can you hear me okay? Excellent. Well, good afternoon and thank you for the invitation to join you today at this workshop. I would like to thank the Commissioners for hosting this, this is extremely important to have these sorts of exchanges and EPA is very happy to participate in this, so thank you for that and for all the panelists this morning who provided outstanding context and information going forward.

Again, I run the West Coast Collaborative out of our EPA Region 9 office in San Francisco. I'm in the Clean Energy and Climate Change Office, as well, and our Air Division, and you know EPA overall, we're a regulatory agency,

although we have had some opportunity to retain some of our incentive programs and voluntary programs, so I'll be mostly covering those today.

But I would be remiss if I don't go over the real basis for our work at EPA, and that is to protect human health and the environment, and in this particular case our air quality.

The purpose of this particular slide is to just demonstrate that in California we have some of the worst air quality in the country that we're dealing with, and those two areas highlighted, the South Coast Air Basis and the San Joaquin Valley Air Basins. So relative to the rest of the country, those two air basins affect a very very large percentage of the national population to unhealthful air quality at many times throughout the year.

This again is to demonstrate looking forward into the 2020 time horizon. We have our standards for air quality particulate matter, air quality standards, and you can see about the entire country will be in compliance, with the exception of these areas here, these seven counties, and those again fall in the South Coast and San Joaquin Valley Air Basins. And the point

in laying all of this out is to say that we need every technology possible to address the air quality issues in these air basins. And the more that we can demonstrate here in California in these air basins, the more those can flood out into the rest of the country, too, because as we know, California serves as a great incubator for the rest of the nation when it comes to clean technologies.

Here, I want to just demonstrate -- illustrate, really -- the South Coast air quality looking out into the 2023 timeframe. This is to show the major sources of NO_x emissions and NO_x, just as a background, is a precursor for ozone, ground level ozone formation, which is very harmful to breathe at the ground level, it's much better when it's way up in the sky protecting us from ultraviolet rays. And so you can see here that we have the three top sources, mobile sources, that is, for NO_x emissions in the South Coast are diesel, heavy-duty diesel trucks, off road equipment, and ships and vessels, as well.

A similar picture in the San Joaquin Valley. We have a slightly different distribution of sources, but we're still looking

at diesel, so those are the main focuses of much of our sort of voluntary incentive-based work, and indeed much of our regulatory work, as well.

Here we have, oh goodness, I forgot I had this animated slide, okay, so moving on, the first initiative I'd like to talk about is what Commissioner Scott had said in the introduction, this is the West Coast Collaborative, it is a public-private partnership that focuses primarily on reducing diesel emissions. We do try to get greenhouse gas co-benefits from all of the work that we do under the West Coast Collaborative. The WCC falls under a larger umbrella of the National Clean Diesel Campaign that's run out of our headquarters office in Washington, D.C., and there are Collaboratives all over the country; the one I'll be focusing on here today is the one that I run here out of our San Francisco office, and that focuses indeed on California, heavily on California, but we also do focus on our other states within our region, and also in our Region 10 office in the Pacific Northwest.

We do a lot of work on low and zero emission medium- and heavy-duty technology deployment. Our focus isn't necessarily on

light-duty, although we do like to find synergies where we can with light-duty applications like charging infrastructure and the like, so we can bring the cost down for everybody that uses these sources of technologies.

We focus in areas of policy and partnership development. On the policy front, we try to ensure that through our own National Environmental Policy Act, or the NEPA review when we have projects that are being built, highways or bridges, or what have you, that the cleanest technology is used for construction equipment, for example, to make sure that those emissions are the lowest that they can be. We also leverage and capitalize on Supplemental Environmental Projects, which essentially takes penalty funds and directs those towards projects to reduce emissions and other in-use initiatives at the state and local level.

Many of our partnerships are from folks that we've heard from today, DOE, the Clean Cities Coalitions, and other parts of DOE, the California High Efficiency Advanced Truck, the Natural Gas Vehicle Partnership, and we work very closely with our ports in the San Pedro Bay and

South Coast on their technology advancement program, CARB Air Districts and other private and public entities.

We also administer grants. I've heard a lot of figures this morning and our figures are not as impressive, but nonetheless, they are still something to bring to the table to help leverage other federal and state and local and private funding to advance clean diesel technologies.

This past year, our FY '13 funds just within our region, you can see, are laid out here. This year we began a new RFP program that's focused solely on ports, so emission reductions from ports, and advancing technologies there throughout the country, and we also have instituted a new rebate program whereby we will provide a rebate upon completion of the project up to a certain amount, focused on school busses, we focused on construction equipment, and this year we'll probably be focused on refuse haulers and trash trucks.

I would be remiss not to put in a plug for DERA, our Diesel Emission Reduction Act funding, we've been very very lucky to have this

funding, it's been appropriated twice -- authorized, excuse me, twice. And our second authorization is coming to an end here in 2016. We believe our partners have gained a lot of benefit and, indeed, the public has gained a lot of benefit from the implementation of projects under the DERA program. In fact, investments in clean diesel projects, for every dollar invested in clean diesel projects, we estimate about a seven to eighteen dollar return on investment in terms of public health benefits, so reduced hospital visits, asthma attacks, and the like. So a very very good investment on the Public Health Benefits Fund.

Also, we leverage about three dollars in federal, private, and other partner funding for every dollar that we invest, so it's a great program and we hope it will be reauthorized again for another five years, or whatever Congress thinks is appropriate.

We do have another -- I think it's important to mention here -- another solicitation coming out. I did highlight that here, FY '14, it's an estimate what we will have out of the region here in San Francisco for California and

other states. The release date, it will hopefully be very very soon for our Request for Proposals for this Grant Program, and ideally before the end of this month if everything is on track.

I did want to mention also, we sort of alluded to it in the 3:1 figure, and we do require matching funds in our projects, so whoever that may be, other agencies at the state and local level, private, to bring to the table. And it ranges anywhere from EPA paying 100 percent for, say, simple retrofits, to EPA paying 25, and then the partners paying 75. So there's definitely a matching requirement there.

And moving on to the types of projects that we have funded, you will not see Fuel Cells on here, however, that may change in the future as this year is the first year in this next grant cycle, it's the first year we've actually received approval to fund Fuel Cell projects on a limited basis, which we're really excited about. The limited basis is essentially what has been already more or less demonstrated to work -- forklifts, for example, I heard that in Sunita's presentation, drayage trucks, as well as urban

transit buses, so those are all eligible for funding this year, which we're very excited about.

But in the past, this is the sort of range of technologies, if you will, that we have funded through the West Coast Collaborative DERA program, everything from very low-tech, if you will, sort of clean diesel engines to replace old diesel engines, to Battery Electric, Zero Emission, Hybrid Natural Gas, we've done some renewable natural gas replacements actually here with our Sacramento Metropolitan AQMD partners to replace refuse haulers. And the list goes on. This is just to give you a sampling of the types of projects that we have funded in the past, and hopefully Fuel Cells will be in the future.

The next initiative I wanted to highlight is a very important initiative, it's called our Clean Air Technology Initiative, it was established essentially to focus on those two districts, on those two air basins that I mentioned at the onset of the presentation to help bring them into attainment with the National Air Quality Standards. And again, to do that we know that really innovative technologies and zero

emission technologies are the only way we're going to get there. So this initiative was developed to focus on those two areas and invest in those new technologies to combat those worse air quality air basins, and also working with our partners that are listed here, and many are in the room, the California Air Resources Board, our South Coast AQMD, and San Joaquin Valley Air Pollution Control District partners, as well as the California Energy Commission.

So our goal here again is to leverage funding and bring funding to the table, and leverage funding as well to advance those technologies, including Fuel Cells. Part of our partnership involvement under the Clean Air Technology Initiative is the California Fuel Cell Partnership, EPA Region 9 has been involved in that in the past couple of years now. EPA as a whole from our headquarters has been involved for a number of years, and that may continue to happen into the future.

The Plug-In Electric Vehicle Collaborative, as well, is a stakeholder partnership, as well as California Environmental Dialogue and others.

Again, I won't spend too much time on this, Goals essentially are to promote technologies that are going to get us significant emission reductions and bring money to the table and look at policies and other perhaps regulatory mechanisms to help make that happen.

Here is just a sampling of the types of projects that have been funded with partnership funding, of course. And these projects are placed on sort of the timeline, if you will, of technology development from the kind of creation of new technology to the mass deployment of technologies. So you'll see here, there is a Fuel Cell, we did help to fund a Fuel Cell Drayage Truck and Buses, some Hydraulic Hybrids, Battery Electric, Heavy-Duty Drayage Trucks, and some of the delivery trucks we've been talking about, the Medium-Duty Battery Electric Trucks, as well.

And I didn't include the actual projects, but I can certain send that along as additional information, as follow-up if that would be desired. We do have a list of projects and an amount of funding that was brought to the table and descriptions of what those projects have

accomplished over the years.

This is intended just to demonstrate the funding that's been provided from EPA Region 9 to the San Joaquin Valley Air Pollution Control District, primarily working through their District's Technology Advancement Program, to demonstrate these technologies, work with the equipment operators to demonstrate the mobile source, even some renewable energy and waste energy and technologies.

Similarly with the South Coast Air Quality Management District, we funded close to $4 million from EPA to support low and zero emission technologies in that air basin, as well.

And then some areas of potential cross-agency funding collaboration, just general collaboration listed here. When we're thinking about funding and RFPs and any sort of bid for proposals, solicitation for proposals, to the extent it's possible, I know we're all on different budgetary timelines and what have you, but coordinating to the timing and duration of RFP funding, making sure we're filling gaps where another grant program might not be able to fund. I alluded to charging infrastructure, for

example, or any kind of fueling infrastructure, for example, our DERA program cannot fund fueling infrastructure, unfortunately. So we're always looking for, you know, if we're going to fund a Plug-In Electric Vehicle, we're looking for partners to fund those charging stations, for example. And we actually in fact have done that with our South Coast partners on a couple of occasions. So those sorts of synergies, we're always looking for. And similarly on natural gas fueling infrastructure, same sort of deal.

From our perspective, we'd really like to focus funding on the areas of non-attainment for air quality standards, which again are big ones, are the South Coast and San Joaquin Valley Air Basins. In any solicitation or proposal, to make sure that we incorporate criteria air pollutant emission reduction metrics, so points are given for reducing emissions and the like in any solicitation. I just covered the supporting all fuel and charging infrastructure for both public access and fleet applications, as well, that sort of gets at the usage issue; we want to maximize the usage and make sure those investments and infrastructure are paying off and aren't sitting

idle, they're actually being used. So to make sure we find those synergies where we can have public access and fleet access, as well.

Let's see here, supporting heavy-duty alternative fuel technologies, with a particular emphasis on making sure we get rid of those older vehicles, those less advanced technology vehicles, if you will, not just putting a filter on, for example, but actually getting the new Fuel Cells, for example, on the road, and getting rid of those old diesel engines. And again, prioritizing projects that match or leverage federal funding.

And then, similar to what Sunita had brought up for DOE, we have a partnership, we send out newsletters regularly that includes funding, not just ours, but all of our other partners at the federal, state and local levels. We have regular working group meetings that folks can participate in and all this information is on our WestCoastCollaborative.org website.

We also have a very important partners meeting that is coming up in San Francisco this September, it's the best weather in San Francisco at that time, so please join us, it's free,

there's no registration fee, it'll be at the Parc 55 Hotel, the information again is on our website, and we will be discussing all the latest issues on policy surrounding, you know, in Fuel Cells, but also other alternatively fueled vehicles, regulations, the technology pros and cons, and funding and everything else.

So with that, these are the two websites for the two initiatives I've covered today from EPA, the West Coast Collaborative and the EPA Clean Technology Initiative. And I'd be happy to take comments and provide any follow-up information as needed.

COMMISSIONER SCOTT: Okay, thank you very much, Penny. This is terrific information to hear what the West Coast Collaborative is working on. And I would just follow-up with you to say, yes, please, I would love to see that information on the funded projects and how they're turning out. I think that would be terrific for us to have. Questions? Okay, I'm going to go on to Damian Breen from the Bay Area Air Quality Management District.

Mr. Breen currently heads up the Innovation Section of the Bay Area Air Quality

Management District where he directs a staff of 38 in the oversight, management and administration of an annual budget of $85 million. The Section executes innovative incentives programs and develops and supports the Air District's data, finance and permitting information Technology Programs in order to reduce criteria pollutant and greenhouse gas emissions.

Mr. Breen previously served as the Director of the Strategic Incentives Division where he oversaw the Grant Programs targeted by the Air District to reduce greenhouse gases, particulate matter and health risk, and also worked for 10 years in the Air District's Compliance and Enforcement Division. He possesses a wealth of knowledge on California Regulations pertaining to both mobile and stationary sources. Mr. Breen holds two Bachelors of Science degrees, one in Geology from the National University of Iowa, and one in Pollution Assessment and Control from the Irish Institute for Technology. Welcome, Damian.

MR. BREEN: Hello. Thank you very much for having me here today. So what I wanted to

do, if you could move it to the next slide, I just wanted to give you an introduction to the Air District and talk about our funding streams and, you know, the focus of kind of this session today was really to talk about leveraging and how we make these grant programs work together. And I have a couple of examples here that I hope will spur folks to think about how we leverage this funding and hopefully give you the advantage and benefit of some of the knowledge and some of the work that we've done, and to talk a little bit about how funding sources work together.

So if you'll skip to the next slide, I'll talk to you a little bit first about the Air District itself, and we're principally a regulatory agency, we have permits for 18,000 stationary resources of pollution here in the nine-county Bay Area, and it's the second densest urban area in the United States with a population of about seven million people spread throughout nine counties. And in that area, as I said, we permit everything from mom and pop dry cleaners up to the five largest refineries in Northern California. And our mission in that area is to protect and improve public health, air quality,

and the global climate. And in order to achieve that mission, we see advance technology for transportation and alternative fuels as being one of the principal methods that we can use to tackle mobile sources of air pollution. We have very limited authority in that area and, in terms of our pollution issues, about 85 percent of our health risk in the region is driven by onboard sources of diesel pollution; forty percent of our greenhouse gases come from mobile sources; and about 50 percent of our air pollution. So you heard the folks from the EPA talk about the problems they have with criteria pollutants, and because of our density we have issues that are basically health related because of those emissions from the highways right adjacent to folks' homes.

So if you go to the next slide. One of the principal methods that we use to address those mobile sources of emissions is our incentive funding. As you can see here, we have incentives that total about $55 million a year, and this comes from a range of different sources, it comes from legislative action by the State of California, which provides DMV fees, about $6.00

on every vehicle registered in the area, we have about 3.5 million vehicles in the Bay Area. That means if you take our population, some people mostly drive in two vehicles at the same time, we have so many, but in reality what we do with this funding, I think, is really the interesting thing.

We invest in a portfolio of different measures that basically reduces air pollution by buying and destroyed older, higher polluting heavy-duty diesel engines. We also invest in alternative transportation to reduce vehicle miles traveled. That means we invest in things like bicycle sharing, shuttles, Electric Vehicles, we also invest this funding in education campaigns and in technology and innovation programs.

The $55 million that you see here is what we get on an annual basis, and that leverage is about 4:1 in terms of private investment. And we also use this funding to roll over and leverage other federal, state and local funds.

And so if you're turn to the next slide, the principal mechanism that we use to do that is our Transportation Fund for Clean Air. That

comes from a $4.00 DMV surcharge assessed on vehicles that are registered within the Bay Area, and because of the way that program is actually set up legislatively, it's one of our most flexible programs, and it allows us to do the most innovative and different types of projects.

You will see here that last year we had about $24 million in that program and we use it on everything from shuttles and ridesharing to commuter benefits plans that we put in place here, alt fuels, bike sharing, any sort of innovative or technologies that are in the region that can reduce either vehicle miles traveled, or direct emissions.

If you'll turn to the next slide, you'll see that in terms of the funding that we are providing for Electric Vehicles, we wanted to show this as an example of some of the leveraging, so we've got about $14.75 million available for Electric Vehicles, and through our investments over the last two years, and that has leveraged a half million dollars in CEC funding.

If you'll flip to the next slide, you'll see that we have in that area funds available for Natural Gas and Hydrogen projects, we have funds

available for Electric Vehicle Rebates, for buy-down of vehicles for public agencies, a buy-down program for residents and businesses, money for DC quick charger deployment, money for workplace and destination chargers, and then other PEV-related projects.

So turning to the next slide, that funding and funding like it in the past gives us the opportunity to leverage other sources of monies. You will see here that $6 million from that investment this year will actually leverage $8.7 million in CMAQ funding from our Municipal planning organization, the Metropolitan Transportation Commission, to do bicycle sharing. Funding from our program previously provided $276,000 in match to bring CEC and DOE funding to the State of California to do Plug-In Electric Vehicle planning. We are actually this year in the process of providing $100,000 to provide a million dollars in monies to develop Hydrogen, Natural Gas, and Electric Vehicle training, planning, best practices to the Department of Energy. And again, another example of how we use that funding for leveraging, you see there that that $500,000 that we just talked about was

leveraged by an investment, a local match of close to a million dollars.

We've also done projects with the U.S. EPA where we've taken grant funding for heavy-duty vehicles, about $26 million in local funding, and leveraged $3 million in Federal Funding. We've taken local funds from our transportation funds for clean air and leveraged monies from settlements to do Electric Vehicle Car Sharing Programs in the region, and we've also taken money from our TFCA funding again to leverage DOT, Department of Transportation funds to do both Marine Highway projects, which is charge protection of goods by marine vessels versus over-the-road, and to do shore power, which is where we plug ships into electric power rather than having them idle their engines at our shorelines, basically polluting the adjacent communities.

So as we look at our sources of local funding, we're always driving at two goals, one of those goals is to leverage other sources of funding, and then our ultimate goal obviously is to reduce emissions. So as we look at the monies that we have, we're always trying to line up our

solicitations and our funding sources with other sources of funding available throughout the state, and that includes the CEC's funding for alternative fuel and infrastructure, and it includes money that is provided for Plug-In Electric Vehicle infrastructure, and then it includes money from the California Air Resources Board, and U.S. EPA, and our local Metropolitan Planning Organization for Electric Vehicles and VMT Emissions Reduction Projects.

And if you'll turn to the next slide, how we actually do this is we have a number of different mechanisms. Depending on the funding source, we either go for these joint solicitations which is whereby we'll take our source of funding, marry it with another source of funding, and then go out for a joint solicitation, which means that somebody who is looking for a grant comes and gets it through one source. This is probably the most efficient way to leverage funding, it's definitely the best for the Grantees, but it does create problems for us in terms of trying to line up distribution cycles, budgets, all of those things that you could imagine when you try to put money together

from different sources.

Another mechanism that we use here very successfully is the idea of multiple solicitations whereby one agency issues an RFP in the region, or a solicitation in the state, and we look at the results of that solicitation, and then we either build in additional funds to fund projects that didn't receive funding, or where we essentially provide more funding to do projects that are preexisting.

So that gives you kind of a pretty quick run-through of our sources of funding and how we use then, and then how we marry them up, and with other sources of funding. And I was just going to pause there. I think my next slide is pausing for questions. So because we're talking about this leveraging, and because we have folks on the line who I think are interested in doing these types of things, I thought we would provide you with a list of our program contacts. These are the folks you should talk to here at the Bay Area Air Quality Management District if you have interest in looking at sources of funding that you may have come available, looking at projects where you're over-subscribed and you want to do a

project that could result in air quality emissions reductions. So these are the folks here who you should contact in our organization, and we are always open to ideas and to doing projects where we can leverage and get some air quality emissions reductions. So I'll pause there for questions.

COMMISSIONER SCOTT: Well, this is terrific, Damian. Thank you so much for this great presentation and for your willingness to be open to ideas. I had actually written down exactly the same phrase that the Energy Commission is also open to ideas and sharing information, and just kind of rolling up our sleeves and brainstorming to figure out where there are places where we can continue to work together. And I was excited to see -- and I know that we all do work together to try to leverage one another's funds, but I appreciate how you highlighted the different places where we have been doing that, it's great to know that's going on and to think about where there are other places that we could continue to do that.

MR. BREEN: Yeah, you know, I think the one thing that, as we think about this, you also

have to kind of step to the other side of the equation and think about the folks that we're actually trying to encourage to perform these technologies and adopt these technologies. From their perspective, you know, the single source of grant funding is always best in terms of their administration, but sometimes you have to do things a little bit differently in order to give them the best benefit or the most amount of funding. And that communication process and keeping those lines of communication open with the industry and the Grantees is one of the things I think is also important, that it came out a little bit, but I think is something that you need to really think about as you think about this leveraging question and how to do it.

COMMISSIONER SCOTT: Yeah, that's a great suggestion and something that we will be sure to be mindful of. So let's go to our next presentation which is by Clark Williams.

Clark Williams is a Manager of the Product Stewardship and Innovative Technologies Section at CalRecycle. Clark was a Co-Lead in the development of waste sector of the AB 32 Scoping Plan, which sets forth a series of

actions needed to achieve a statewide 75 percent recycling goal in ways that will support greenhouse gas emissions reductions, while realizing environmental co-benefits and job growth.

Clark oversees the implementation of extended producer responsibility programs for the management of carpet, paint and mattresses, as well as the department's work related to packaging and bioplastics. Clark has been with CalRecycle since 2000 and is a graduate from the University of California at Davis. Welcome, Clark.

MR. WILLIAMS: Thank you. I appreciate the invitation to join here today. So I'll jump right in here, and this is a little bit in contrast to some of the programs that have been described previously, and this is a newer program and doesn't have some of the metrics from past cycles of funding.

What I'm going to talk about today is a proposal that has been put forth as part of the Governor's Budget, to use a portion of the cap-in-trade revenues that have been generated under California's AB 32 program to fund

infrastructure. So the proposal is $30 million which we'd be using for investments in capital infrastructure to reduce greenhouse gas emissions by expanding the waste management infrastructure to increase recycling of organics and also traditional recyclables like fiber, plastic, and glass materials. This concept still needs legislative approval and there's also no certainly at this point in time about the continuity of the funding in future fiscal years.

So there's really two main policy drivers behind this funding source, the first is the State's efforts to achieve our AB 32 goals and reduce greenhouse gas emissions. Since that was enacted back in 2006, there's been a number of efforts to reduce emissions from what we like to call the Waste Management Sector, through additional direct regulation measures on landfills, enactment of commercial recycling requirements on businesses, but there's still great opportunities within the Waste Management Sector. And the update to the Scoping Plan really calls for a need for additional investments in recycling and composting in our production facilities to further reduce the

emissions from the waste sector.

The second real big policy driver for us is the state has an aspirational goal to achieve a 75 percent recycling rate. We've made great strides in the state to reduce our waste in the landfills since 1990, we've exceeded our 50 percent recycling goals of the state, and now we've set an aspirational goal of 75 percent that the department is working hard to achieve.

I want to take just a minute to help illustrate a little bit the connection between the recycling activities and greenhouse gas emission reductions. Methane emissions from California landfills are annually about seven million metric tons of carbon dioxide equivalents, compostable organics, which is feedstock for renewable transportation fuel production that make up a significant portion of what we send to landfills. Over 30 percent of what we send to landfills could be used as feedstock to produce transportation fuels.

Keeping two of these materials, in particular that a number of applicants' projects got funding through other CEC programs are using to produce renewable natural gas, food waste, and

also green materials, yard trimmings, etc., if we keep just those out of landfills, we achieve about a four million metric ton emission reduction annually.

We've estimated that meeting our 75 percent goals of state would result somewhere in the neighborhood of 20-30 million metric tons of carbon dioxide equivalents that are kept out of the atmosphere.

So to help achieve these policy drivers, what the department has proposed for this $30 million is really to break it up into three separate buckets, the first pot of funding roughly $50 million would be for grants, for what we call organics processing. This would be things like composting, anaerobic digestion projects. Under this program we're proposing a maximum grant award amount of $3 million, so relatively small compared to some of the other programs that have been discussed. And of course, the projects need to demonstrate and achieve real permanent and additional greenhouse gas emission reductions.

One of the reasons that this allocation for our grants is larger than some of the other

funding allocations here is it's much larger, a significant portion of our waste stream, and we see a number of co-benefits from getting this material out of a landfill.

The second bucket, and the smallest one we have here, is for manufacturing projects that would be using fiber, plaster, glass materials that are previously sent to a landfill in California to produce products, and so by doing so you avoid a lot of upstream emissions in the manufacturing process associated with harvesting, extracting, and processing virgin feedstocks. Once again, this has a maximum grant amount of $3 million.

And the third bucket that we have proposed funding for is for a loan program. The Department operates an existing revolving loan fund, this would be augmenting that and changing the focus a little bit to encompass specifically the greenhouse gas emission reductions, $10 million; eligible projects would include construction or expansion of facilities, purchase of equipment and machinery, and also real estate improvements. The low interest loans we offer currently have an interest rate of four percent

and a repayment term of either 10 or 15 years, depending on the particulars of the project.

After the loans are issued, all the loan funds are encumbered, we would be receiving principle and interest repayments. So we would anticipate that, moving forward, after we remove our overhead costs, we'd have about on the order of $800,000 to reinvest in additional loans into the future. So that might be another one to two loans we're guessing in future years.

We have a number of goals and co-benefits from this program, of course, given the source of the funding, the primary one is to achieve our additional greenhouse gas emission reductions, to get at some of the state's other waste reduction goals we really need more infrastructure in the state, we rely heavily on export markets for a number of the materials that are recycled today, those global markets tend to fluctuate and we'd really like to get some more stability in those markets and we see one way to achieve that is by bringing additional manufacturing back to California and realizing some of those economic and job benefits with doing so.

Another big priority is looking at how we

can benefit disadvantaged communities, both from an environmental, a social, and an economic perspective, and that is certainly reflected in the scoring criteria that we're drafting and have run through with our stakeholders.

A number of other co-benefits that are outlined in the scoring criteria, air and water protection improvements, jobs, and of course transportation energy production.

All three of these programs will be competitive in nature. They really need to demonstrate the greenhouse gas emission reductions, as well as the fact that they are utilizing feedstocks that were previously landfilled within the state. We have a real priority, as well, on looking at projects that are going to be able to move forward fairly quickly, we're hoping to avoid situations where folks are tied up in permitting and conditional use permits, things of that nature, and then once again we want to really benefit some of the disadvantaged communities in the state.

Next steps, we've got going on this pretty quick since the Governor released his budget in January. We had some workshops in

February, and later this week we're hoping to release our first application package, or Notice of Funding Available for our Organics Program. We'll follow that up, the plan is a couple weeks later, with the traditional Recyclables Program, looking to receive applications back in July, do the review, award in September, and then we're hopeful to get the lion's share of grant agreements in place by the end of this calendar year, to give folks the maximum amount of time to have their projects get up and running before the grant funds expire.

So this last link here, you can access a number of the criteria we've proposed if you're interested in following or getting more information, there's also a listserv, greenhouse gas reduction grant program listserv that you can access through this website to get more information. And I would say we have a number of projects that we work closely with CEC on that have been funded through our loan program, as well as through some other funding opportunities. And to us, we think this is a real good opportunity to continue to leverage that and realize some more good projects that hopefully

will produce transportation fuels in the state. And I'd be happy to take any comments or questions.

COMMISSIONER SCOTT: Well, thank you, Clark. I think this is a really interesting area for us, as well, because we've got an entire sort of Advanced Biofuels area that we fund, as you know, at the Commission. And so thinking about the places where the waste to energy types of projects, especially as they're making transportation-related fuels, is just something that I'm interested in being mindful of, and I know that the team here is, as well. So this was a good presentation. Thank you.

Okay, so we will go on to Andy Panson. Andy Panson is a staff Air Pollution Specialist with the Air Resources Board's Mobile Source Control Division. Andy has worked at the Air Resources Board for nearly 20 years with a focus in developing and implementing mobile source incentive programs and air quality planning. Welcome, Andy.

MR. PANSON: Thanks for inviting me to speak today on ARB's Incentive Programs. My presentation will cover two of ARB's programs

which focus on advanced technologies and are most germane to today's workshop. These are the Air Quality Improvement Program, or AQIP, and the new Cap-and-Trade Auction Proceeds Program. However, for completeness and context, I've listed ARB's full portfolio of incentive programs on this slide. Each has a slightly different statutory direction and goals, some focus on near term emission reductions, and in others we've chosen to focus on longer term reductions; but collectively they fit together to address a multitude of air quality challenges.

Now on to the AQIP. As you know, the AQIP was established in 2007 by Assembly Bill 118, along with the Alternative and Renewable Fuel and Vehicle Technology Program. I think we won the acronym -- we got the better side of the acronym there. I know why you call your program the AB 118 program, which just doesn't quite roll off the tongue.

Most of the funding to date has gone to consumer rebates for zero emission and plug-in passenger vehicles through our Clean Vehicle Rebate Project, or CVRP, and vouchers for the purchase of hybrid and zero emission trucks and

buses through the HVIP.

We also have a Truck Loan Assistance Program which help small business truckers affected by ARB's regulations secure financing for clean truck upgrades. CPCFA implements that program for us and Reneé provided an overview of that program, as well as the Loan Loss Reserve concept in her presentation this morning.

And finally, AQIP has a small component that funds Advanced Technology Demonstration Projects, which is focused on marine vessel, locomotive, and off-road equipment projects.

AQIP complements and is closely coordinated with the Energy Commission's AB 118 Program. The electric charging and hydrogen fueling infrastructure that the Energy Commission funds is critical to support vehicle deployment, and that's a great example of just the natural synergy and leveraging that is accomplished between our two programs. The Energy Commission has also taken a lead in funding heavy-duty vehicle demonstration projects, which has allowed ARB to focus our limited resources on deployment projects. And as John Butler mentioned this morning, the Commission has also provided funding

directly to ARB for the CVRP to help us meet demand. This close coordination has benefitted both of our agencies' programs.

The Cap-and-Trade Auction Proceeds provide a new source of incentive funding to reduce greenhouse gases. For the upcoming funding year, the Governor has proposed $200 million in low carbon transportation funding for ARB, consistent with the Investment Plan submitted to the Legislature last year. These funds will be used to expand the AQIP projects I just overviewed.

This chart illustrates how AQIP provides incentives for technologies at various stages of their development, and in each stage different incentive approaches are appropriate. In the initial technology development phase, relatively large investments for small numbers of vehicle or equipment are used to demonstrate the viability of advanced technologies in order to help them reach the commercialization stage.

To date, AQIP has only funded a limited number of demonstration projects due to our limited budget, however, with the availability of Cap-and-Trade Auction proceeds, we will be able

to greatly expand support for these types of projects.

Moving on to the next phase, Commercialization, we focus incentives to encourage early consumer adoption of new technologies to help the technology become established in the market and ultimately grow to become self-sustaining. To date, we focus most of our AQIP funding in this phase through the CVRP and HVIP.

As sales grow and economies of scale start to be realized, incentive funding levels and eligibility requirements can be adjusted to reduce per vehicle funding in order to better target incentives where they will have the greatest impact. For example, the CVRP is in this growth phase, and accordingly, we are proposing to lower rebate levels in the upcoming funding cycle for the battery and plug-in vehicles that have been in the market for several years, or providing higher per vehicle rebate levels for the new Fuel Cell Vehicles just about to enter the market.

Finally, if all goes well, a technology enters the transition phase where market

acceptance has been achieved, and we start to focus investments towards economically challenged populations. Our Truck Loan Assistance Program is an example of a project in this phase.

Because the majority of funding to date has been used to support deployment projects progressing through the various levels of commercialization, I'll focus for a minute on one of our largest projects, the CVRP.

This slide illustrates the growth in demand for light-duty vehicle rebates. Matching our available funding with the level of incentives we believe necessary to motivate early consumer purchase for ZEVs and Plug-In Hybrids has been a challenge. This year the Legislature stepped in with additional funding to meet consumer demand, as the scale of the CVRP is now exceeding AQIP's $25 million per year budget.

With the new Fiscal Year starting in July, we plan to make changes that will align the CVRP project needs with budgetary limitations. This combined with new Cap-and-Trade Auction proceeds will allow us to continue the CVRP during this key period of market growth.

Moving forward, ARB staff is developing

the Fiscal Year 2014-2015 Funding Plan which will allocate the combined $222 million from AQIP and the new Cap-and-Trade Auction Proceeds Program. This chart shows the funding proposal we workshopped at our April 3rd workshop. Because projects typically funded by AQIP support the same goals identified in the Governor's proposed budget for Low Carbon Transportation Projects, this year's funding will expand the successful AQIP Program while focusing additional investments on disadvantaged communities, which is a key element of the statutes governing the Cap-And-Trade Auction Proceeds. This will allow the Zero Emission and Plug-In Hybrid Vehicles funded through CVRP to continue to evolve further through the commercialization phase, as well as initiate pilot projects aimed at starting to bring these technologies to disadvantaged communities, which is again a key element of both the Cap-and-Trade Proceeds Statute and a key element of the Technology Evolution Chart that I showed earlier in my presentation.

The funding will also continue to support Hybrid and Zero Emission Truck and Buses through the HVIP and Zero Emission Truck and Bus Pilot

Projects. And it will allow us to make for the first time significant investments in Advanced Technology Demonstration Projects with the focus on the freight sector in near disadvantaged communities.

Public funding for these types of projects is key to bringing cleaner technologies into new sectors which will be needed if California hopes to meet our long term air quality and climate change goals. And this Advanced Technology Demonstration Category is an area where we're going to need to have a lot of close coordination with the Energy Commission because that's also an area that you fund, and we've already met with Jim McKinney and his team to start to talk about this, and I think we're going to have a lot more discussions moving forward to make sure that we're spending these funds in a coordinated and collaborative approach.

And that wraps up my short introduction to the Advanced Technology Incentive Programs at ARB, and I'd be happy to answer any questions that you might have.

COMMISSIONER SCOTT: All right. Thank

you, Andy for this also interesting and informative presentation. I think we've had a really good set of presentations, we've had some information from our federal partners, from our state partners, from our regional partners, and that's just kind of a sampling of all of the things that are going on out there.

What I'd like to do is, if other folks in the room have questions, remind you to submit a blue card, please, to our team so that they can come up here to me for comments. But before we jump to public comment, I wanted to just ask the panel a few questions. Hopefully we still have Damian on the phone. And one of the questions that I had for all of you, I was looking at the amount of leveraged funds, and it was $3.00 and $4.00 and many, and so I'm wondering when you put yours together, what does your typical match share look like when you're doing a Request for Proposals, or a solicitation? So that's kind of the first part of the question. And the second part of the question is, if we flip back to Damian's slide, sorry to do that to you, IEPR team, which was number 8, I think –- yeah -- he listed out and gave us some specific examples of

how they are leveraging additional funds. And so I wanted to follow-up and ask you all that, as well. So I don't know who wants to start.

MR. BREEN: I can start. So leveraging in the various programs can depend on some of the requirements of the guidelines, so in certain programs we're set up where there is a mandatory match from the Grantee that can be as low as 15 percent and as high as 90 percent. As we set up our funding sources, we always think about the problem that we're trying to solve, and that basically means that as we go more towards technologies that are in the commercialization or pre-commercialization kind of area, our requirement for match is probably lower because the dollar amounts that we're talking about are higher, and then as we're in the commercializing area, technology that is well understood, our match there is generally a little bit higher, but the dollar amounts are less. So that gives you an idea of kind of how we approach that issue.

COMMISSIONER SCOTT: Yep. Thank you.

MR. PANSON: Yeah, I can echo what Damian said. It really differs depending on kind of what phase of the technology advancement path

you're on, where the earlier pre-commercialization projects generally need a higher level of public funding, and as you move further along, the leveraging gets higher and higher. With our demonstration projects, we've required a minimum, or we provide a 50-50 cost share with priority being given to projects or applications where the private investment is higher, but we would go to 50-50. And actually, with some of the larger demonstration projects we're contemplating with the Cap-and-Trade proceeds, we're thinking that the state share would be even higher, recognizing that if you want to do these really big ticket items, it requires a significant public investment. And as we are providing rebates for already commercialized technologies, we're providing a much lower level of incentive where we're providing right now for a ZEV passenger car a $2,500 rebate, and then ultimately moving along to the loan programs, I think there's a substantially higher leveraging that naturally goes along with loans. So it really depends on kind of where the technology is in its evolution.

MS. MCDANIEL: I would echo that. It

definitely depends on where the technology is and in our DERA Grant Program that's pretty straightforward, we lay out mandatory matches depending on what technology and what application is being put forward, anywhere again from, you know, a 25 percent match requirement to a 75 percent match requirement, depending, and in fact if it's a straight-up retrofit, which is quite low tech, zero, we would pay 100 percent public financing for that.

On the kind of newer technologies through the Cleaner Technology Initiative, those funds typically echo the requirements of the Air Districts that we're working with, what their actual matching requirements are.

MR. WILLIAMS: From CalRecycle's perspective, obviously we don't have a history with a number of the grant programs we're proposing. On the loan side, we typically require a 25 percent match requirement, and then where that plays out really is project specific, sometimes the projects have a much higher match than that.

COMMISSIONER SCOTT: Thank you. And then another question that I had for you all is, as

you were going through your presentations and highlighting some of the way that you do solicitations, the projects that you're focused on, lots of ideas were kind of popping out and sparking for me, and I just wondered as you were listening to each other if there was anything that you heard that you might just want to highlight for us.

MR. BREEN: Well, I think one of the, you know, the large investment in Hydrogen over the next couple of months and years, is something that I think really does give us the opportunity to put some of these funding sources together. But I think we need to consider how we're going to do that. The levels of funding and some of the dollar amounts that we've seen kind of on offer from the CEC and from, you know, the feds to get the stations established, are fairly generous. So I expect that we will be significantly over-subscribed for any money that is out there. And so, in terms of leveraging as we look at those programs, the rest of us who have funding available in that area should probably start to think about how we do more, rather than how we incent the projects that are

already rolling forward.

MS. MCDANIEL: I would just add to that, that we should definitely find the gaps where –- I mentioned this in my presentation -- where one source of funding may not be able to fund, say, infrastructure or engines, or what have you, look for those gaps and then try to partner up and, indeed, again, we've done that on a variety of fronts on the fueling infrastructure, whether it be the Electric fueling infrastructure, Natural Gas, and also working with actually some of the anaerobic digester folks for production of the renewable natural gas here in Sacramento to fuel refuge trucks. So those sorts of synergies, I think we need to continue to find those and capitalize on those.

MR. PANSON: I know in the morning presentation regarding the funding for charging stations, you were talking about considering moving into a more -- like a rebate focused program, rather than a solicitation or RFP-based program, and we have a lot of experience doing the rebates. And I think something that is really important and doesn't necessarily always get thought about was your sort of designing

programs to maximize their cost-effectiveness, or this and that, is with consumer-driven rebate programs, making sure that it's easy for consumers to access funding, and easy for businesses to access funding, is really key. I think it actually applies not just to rebates, but to any of our solicitations in that we oftentimes get really caught up in our administrative processes and a lot of the feedback that we've heard specifically relating to the CVRP and HVIP that people really appreciate the care that went into designing programs that are easy for the people who want to get into these technologies to access funding. I think that's really important.

COMMISSIONER SCOTT: Okay, so I recognize that we're a little bit behind time, so I won't ask you any other questions. One thought that I had that we didn't mention, and so I'll just throw it in as we wrap up, there's places where it's great for us to put our money together and really leverage a project or an idea, and then there's places where we have to be careful where we don't have a bunch of double-dipping, so that we're still actually maximizing all of our funds,

and that was just one piece that I wanted to make sure we added to our conversation. So thank you very much. I think this was another high caliber, very interesting panel, so thank you to Sunita, to Penny, to Damian, Clark, and Andy for spending some time here and talking with us about your programs, for your partnership here with the Energy Commission, and we look forward to continuing to share ideas and think about ways where we can leverage each other. So many thanks.

MR. BREEN: Thank you very much for having us.

COMMISSIONER SCOTT: Thank you. We will now turn to public comment. I have one from Bill Boyce from SMUD.

MR. BOYCE: Thank you, Commissioner Scott. I wanted to make comments on a couple things today. First of all, SMUD has had an Electric Transportation Program since 1989 and we've worked infrastructure all the way going back to about 1992, so we've got a wealth of information. First comment really is about this morning. A lot of nuances, I think, didn't really come out as well as they could, and it's

really with regard to the business cases. One of the business cases that really got talked about was fleet, and a lot of those business cases really are not based on a normal business case as we think about a Fuel Cell, it's really the cost savings, fuel switching from gasoline to electricity. So if a known fleet, known operating cost, you can really plot out your business plan. The one that we didn't cover so much, and that was the discussion, was public public charging where the vehicles aren't part of your business plan and you just have to build it and hope people come, and that was really kind of this part about with regards to the market. The other interesting thing, and I think we have quite a bit of the experience in Sacramento, is that business case and public public charging, a large majority of that is all free charging today, and so it's really hard to make a business case when the charging is free. And that is something the industry, I mean, it wasn't brought out today, okay, most of the public charging is free, I don't know how you make a business case off of free charging. And obviously that's being done at the current time to more or less spur the

market development, be an incentive for drivers to build the market which supports the policy goals of the state. One of the things, though, that we've been looking at though is really public public charging is a way to address range anxiety. Our stats show that 80 percent of the people charge at home, the commute demographics, they can all make it, but having -- I don't know what you want to call -- icons out in the community that people can see is important, and that's what's really been driving our investment currently. You may or may not know, but SMUD just opened its own first public DC Fast Charging Station last month, and it's interesting on that in the fact that I think it's been open for just about a month and we've had probably two charging sessions a day, which modestly makes us fairly happy with regards to that, and mind you, we're on very much a commute pattern home, so most of the charging has been there.

But I wanted to talk about the financing of that because I think that's important to the afternoon. SMUD, what we did was we used some of our AB 32 allowance surplus that we auctioned off and internally we all had to write proposals

against each other with regards to greenhouse gas emission reduction, so all that type of funding, and really transportation projects figure very well in that because the reduction in gasoline is very efficient at reducing the greenhouse gas. So in the transportation sector, we actually funded two projects, one was the DC Fast Charging Project, another was kind of an expansion of our truck stop electrification project, which we worked with the 49er Travel Plaza for a long time, so it's interesting using some of that type of money, so, you know, we've also worked with the EPA in the past, so those are good sources of funding that we're finding.

COMMISSIONER SCOTT: Thank you very much for that. I had two thoughts, one, and I had this as we were wrapping up to go to lunch, is that we kind of just scratched the surface this morning and there's a lot of really good information that requires additional diligence, additional information for us to really dig into and think about. So I appreciate you kind of highlighting a few of the gaps. And if you would send to us, I don't know if you have a paper or the information about how you funded your DC Fast

Charger, I would love to have that.

MR. BOYCE: Yeah, we have some of that. I know LADWP has done funding, and I think one thing to consider is the utilities really have a strong play in this area and, you know, in the public power sector we've been very active and definitely can bring a lot to the party.

COMMISSIONER SCOTT: That would be terrific. Thank you. Thank you for coming today. I have another public comment from Noel Crisostomo. Did I get that right? From the California Public Utilities Commission.

MR. CRISOSTOMO: Hi, Commissioner Scott. Thanks for organizing the workshop today, it's been very helpful to understand all the different programs across the state and the federal government. I wanted to understand how incentives designs for the electrification programs might evolve over time to include and consider the operational costs of electric transportation in addition to the purchase of vehicles and infrastructure primarily to mitigate potentially value reducing impacts of demand charges and energy costs, or panel upgrades that might be necessary for certain customers who are

potentially operating at high load factor. There aren't clear answers right now before the Public Utilities Commission, but I just hope to encourage further discussion between the agencies in order to solve these problems for customers that might have their value proposition for electrification eliminated as a result.

COMMISSIONER SCOTT: Thank you. Thank you for coming. Do I have any other blue cards? Any other comments in the room?

MR. FOSTER: Good afternoon, Commissioners. I gave her the blue card to give to you, but apparently it didn't make its way up to you. Quentin Foster here on behalf of the California Electric Transportation Coalition, and I'll be very brief. Cal ETC certainly appreciate the opportunity to participate in the process and comment on this very informative workshop that you had today. I would like to offer a comment, however, in response to a suggestion made earlier by one of the presenters regarding the maturation of the PEV market. We certainly support and want to see the market arrive at a point of maturity where it is driving demand for PEVs, but it's important to note that we're not there quite yet.

While incentives such as the CVRP and HVIP Programs are contributing to the success of the market, I do want to emphasize that market penetration is still very early for vehicle adoption. Only three-years-old, the value proposition to consumers are not yet equal to the cost of the vehicles, making the need for these incentive programs and the continued support from the Energy Commission critical to the continued success and growth of this market. Thank you.

COMMISSIONER SCOTT: Thank you. And if I could ask the folks who made public comment, if you have a business card, if you would give it to our Court Reporter, he would be very happy. Any other comments in the room? Okay, do we have any on the WebEx or the phone?

MS. RAITT: We don't have anybody.

COMMISSIONER SCOTT: All right, well, let me just make a few closing remarks.

First, I just want to say thank you again to our terrific set, I think, of high caliber speakers, John Butler from our Division kicked us off, we heard from David Greene, and then we had two terrific panels. I think some of the themes that I heard throughout the day continue to be

the importance of having a portfolio approach on all of the moving vehicles, that leveraging funding -- and the themes today really were kind of leveraging funding both by considering the financial instruments that we could use, but also by thinking about the various other funding programs that are out there and how they can leverage and complement one another.

And another thought that I had as I was listening to our fellow agencies speak is that some of the instruments that the agency used may also be instruments that we can share with one another.

We talked a lot about the different focuses of the programs, which I thought was really interesting and complementary, as well, so some of them are RD&D, some of them are pre-commercial, some of them are commercial, some of them are scrap page programs, some are focused on reducing vehicle miles traveled, some of us focus on vehicles, fuels and infrastructure, some of us focus on recycling, waste energy, and so it's kind of a broad set, some of them are on-road vehicles, some of them are off-road vehicles, and how it kind of all fits together, and when you

think about what we saw from both David Greene and also from Penny about the air quality and the climate challenges, we actually do need to make sure that we're hitting all of the components of those sectors. And so I would bring it back to kind of the clean air, public health, and climate focus that we all have.

We learned also from David Greene, underscored for us, I think, the importance of incentives and well-timed incentives, and strategic use of incentives to accelerate the timelines to really help us get where we're trying to go. A theme I heard, I think almost every single presenter said this, was public-private partnerships and how those can help. Let me see, we were reminded by Damian Breen at the Bay Area Air Quality Management District to keep industry and the other folks that we are trying to incent to do something in mind as we develop these plans and ideas, and I thought that was a terrific reminder to all of us.

I wanted to let all of you know, of course, that we here at the Energy Commission are open to ideas and thank you for providing so many for us today, and we hope that you're open to

ours, as well. And I think kind of the theme we heard was that there's a lot to do and we can't do it alone, but fortunately we all have our sleeves rolled up, we've got dedicated partners to make forward progress, and we are working with the federal, the state, regional, and local in partnership, in collaboration, in coordination. So it gives me hope that we can continue to make good forward progress.

COMMISSIONER DOUGLAS: Okay, well, that was a great summation, Commissioner Scott. I don't have much to add to that except that I want to thank everyone for being here. These panels were very helpful, the presentations were great. So I appreciated it.

COMMISSIONER SCOTT: We are adjourned. Thank you everyone.

(Whereupon, at 3:14 p.m., the workshop was adjourned.)

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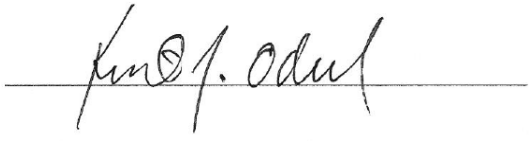

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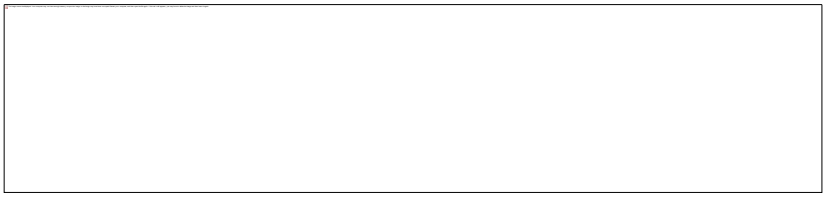

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