BEFORE THE

CALIFORNIA ENERGY COMMISSION

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

Statewide Plug-In Electric Vehicle (PEV) Infrastructure Workshop

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

THURSDAY, JUNE 5, 2014
9:00 A.M.

Reported by:
Kent Odell

APPEARANCES

Commissioners Present (*Via WebEx)

Janea A. Scott, Lead Commissioner for the 2014 IEPR Update
Lead Commissioner on Transportation
Karen Douglas

CEC Staff Present

Heather Raitt, IEPR Lead
Leslie Baroody, Electric Vehicle Program Manager, Fuels and Transportation Division

Presenters (* via WebEx)

Wade Crowfoot, Office of Governor Brown
Dr. Marc Melaina, National Renewable Energy Lab (NREL)
*J.R. DeShazo, UCLA, rep. SCAG Regional Plan Work
Damian Breen, Bay Area Air Quality Management District

Panelists

Christine Kehoe, Executive Director, California Plug-In Electric Vehicle Collaborative
Mark Melaina, National Renewable Energy Laboratories
*Ashley Horvat, State of Oregon EV/Pacific Coast Lead
*Tony Usibelli, State of Washington EV/Pacific Coast Collaborative Lead
Scott Briasco, Los Angeles Department of Water and Power
Terry O'Day, NRG
Richard Lowenthal, ChargePoint
*David Peterson, Nissan
Richard Schorske, Executive Director, EV Communities Alliance
Tom Turrentine, Director, Plug-In Hybrid and Electric Vehicle Research Center at UC Davis
Richard Lowenthal, ChargePoint
Randall Winston, Governor's Office

Public Comment

Joel Pointon, San Diego Gas and Electric
Raoul Renaud
Julian W. Carroll, Green Sphere
Rodney Esteban, Hybrid Haven
Dr. Michael Nicholas, University of California Davis
Ralph Troute, Sacramento Municipal Utilities District
Bonnie Holmes-Gen, American Lung Association California

*Lisa Xue, Natural Resources Defense Council (NRDC)

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P R O C E E D I N G S

JUNE 5, 2014 9:12 a.m.

MS. RAITT: Good morning. Welcome to today's IEPR Workshop on Statewide Plug-In Electric Vehicle (PEV) Infrastructure. The workshop is part of the 2014 IEPR Update.

I'm Heather Raitt, Lead for the IEPR. I'll begin by going over the usual housekeeping items. The restrooms are in the atrium, a snack room is on the second floor under the white awning. In the case of an emergency and we need to evacuate the building, please follow staff to Roosevelt Park which is across the street, diagonal to the building, and wait there until we're told it is safe to return.

Today's workshop is being broadcast through our WebEx Conferencing System and parties should be aware that you're being recorded. We'll post the audio recording on the Energy Commission's website in a few days and the written transcript in about three weeks.

I'll briefly go over the agenda. This morning we have opening comments from Commissioners and then a presentation from staff from the Energy Commission’s PEV Infrastructure Study. Then, Dr. Marc Melaina will present NREL’s Statewide PEV Infrastructure Assessment. We’ll then have two presentations on Regional Infrastructure Plans, followed by a roundtable discussion on Electric Charging Infrastructure in California.

At the end of the discussion, there will be an opportunity for public questions and comments. We’re asking people to limit their comments to three minutes during the public comment period and we’ll first take comments from those in the room, followed by those on WebEx, and then phone-in. Please fill out blue cards and give them to me if you’d like to make comments, they’re on the front table, and come to the center podium and please give us your name and your affiliation, and it’s helpful to give the Court Reporter your business card if you’d like to make comments.

For the WebEx participants, you can use the chat function to tell our WebEx Coordinator that you’d like to ask a question or make a comment during the public comment period, and we’ll relay your question or open your line at the appropriate time. For phone-in only participants, we'll open your lines after we've taken all the other comments.

Materials for this meeting are available on the website and hard copies are on the table at the entrance to the hearing room. We welcome and encourage written comments and request they be submitted by June 19th. The public notice for this meeting explains the process for submitting comments. And I'll turn it over to Commissioner Scott. Thank you.

COMMISSIONER SCOTT: Thank you, Heather. So good morning, everyone. And welcome to the Energy Commission. My name is Janea Scott and I'm the Lead Commissioner for the 2014 Integrated Energy Policy Report Update, and I'm also the Lead Commissioner on Transportation.

Today's workshop is actually our fifth IEPR Workshop since we started this year's report update in March, and the focus of today's workshop, as you all know, is Electric Vehicle Charging Infrastructure in the state.

The Energy Commission is the Lead State agency in the Electric Vehicle Infrastructure space, both through its AB 118 and AB 8 funding, and the Alternative and Renewable Fuel and Vehicle Technology Program, and we are also proud to work with the Governor’s Office and support the Governor’s Zero Emission Vehicle Goals and the Action Plan.

To date, the Energy Commission has made investments to fund over 8,500 chargers in the state, and we’ve also helped to fund the Regional Plug-In Vehicle Readiness Plans across 10 regions of the state, as well as technical work that can be used for future planning and development of electric charging infrastructure in California.

As part of today’s program, we’ll hear about the Commission’s activities to date, starting with an overview presentation of the Commission’s Electric Vehicle Charging Infrastructure Funding Strategy, and how our investments in chargers, regional plans, and technical work fits together.

Next, we will hear from Dr. Marc Melaina, the lead author of the National Renewable Energy Laboratory’s (NREL) California Statewide Plug-In Vehicle Infrastructure Assessment. Dr. Melaina will give an overview of that work, which is intended to illustrate possible future scenarios for deployment of Electric Vehicle chargers to support the rapidly expanding Zero Emission Vehicle markets in California.

Then we'll hear from two of our Regional Partners on the Electric Vehicle Infrastructure Readiness Plans and talk about the plans they've prepared for both the Bay Area and Southern California.

Next, with help from Randall Winston from the Governor's Office, I will lead a panel discussion with the fantastic group of folks who are working on the ground on these issues every day. And the goal that I'd like to put out there for our discussion period is for us to try and identify the near term actions and strategies for accelerating charging infrastructure in a way that continues to grow the electric vehicle market and keep pace with, or be slightly ahead of, the anticipated Electric Vehicle numbers. So with that, I would like to thank and acknowledge Wade Crowfoot who has joined us from the Governor's Office. Wade is the Deputy Cabinet Secretary and Senior Advisor in the Office of Governor Brown, and he's got some opening remarks for you as well.

MR. CROWFOOT: Great. Well, thanks to

those of you who could be here today and those joining by WebEx. Again, I’m Wade Crowfoot from the Governor’s Office. And I wanted to just set some high level context for the conversation that’s happening here today.

You all know that Governor Brown and the State Legislature are large champions of Zero Emission Vehicles, both Plug-In Electric Vehicles and, of course, the hydrogen fuel cell electric vehicles, and with the Governor’s goal, of course, of 1.5 million Zero Emission Vehicles on California’s roadways by 2025.

And I would say that we’re very pleased with the progress to date as it comes to the penetration of Electric Vehicles in California. This fall, I believe there will be 100,000 Electric Vehicles rolling out on California’s roadways, and we think that’s a really big milestone.

Almost two years ago, many of you helped us put together a ZEV Action Plan, which was really focused on providing a very specific roadmap of the actions a State Government should and will take to accelerate the market for Electric Vehicles and Fuel Cell Vehicles. That

Action Plan really had four categories, one of which was infrastructure and specifically planning and building out infrastructure. I think a lot of us have learned quite a lot in the last several years about Plug-In Vehicle infrastructure. I used to work for the City and County of San Francisco on environment and Electric Vehicles, and almost a decade ago we thought the only way someone was going to go out and buy an Electric Vehicle is if almost every other parking meter on the street had a plug. And I say that because, while public charging obviously remains important, I think our understanding of the way that consumers are charging and want to charge has changed over time.

And that really brings us to the conversation today. I'll note some great momentum on Plug-In Electric Vehicles outside of California. We are very proud that California is really the epicenter of the growth of the market, but I'll note that California has partnered with other states, both Oregon and many states on the East Coast, to actually create a multi-state Action Plan to accelerate electric vehicles in other states. And those other states are really looking to what we're doing in California as a model and also to provide lessons learned in terms of what they should be doing and what not to do.

We've got a very specific partnership with Washington and Oregon under the auspices of what's called the Pacific Coast Collaborative, which is an agreement between our three Governors and the Province of British Columbia. Next month on July 23rd, our governments will come together with a focus on expanding Zero Emission Vehicles in our fleets. Our Governors and the Premier of British Columbia made a commitment last October to, by 2016, the 10 percent of fleet purchases of light-duty vehicles in the state and provincial fleet will be Zero Emission Vehicles. And we're looking to essentially expand that target and that commitment beyond just the state and provincial government to local governments, to private fleets, etc.

And then we've been in conversation with countries, including Japan, about what kind of collaboration we can pursue internationally to expand the market for electric vehicles.

So we think now is the right time to assess where we're at with the infrastructure. We understand infrastructure is obviously important not only to consumers using these vehicles, but would-be consumers actually being attracted to buying or leasing these vehicles.

Key questions in our mind, at least in the Governor's Office at this point, are a few fold: one is, we know the importance of home charging, that most of Electric Vehicle owners like myself charge at home, so one goal is how can we make home charging as simple, easy and affordable, how can we help those who live in apartment buildings or multiple unit dwellings to actually have access to home charging that could encourage those residents to become purchasers or leasers of vehicles. So it's really how to expand home charging and make it even more convenient.

On workplace, I think everybody in the room probably knows workplace is probably the second most popular place to charge vehicles, and so what should the state be doing to expand workplace charging? What is the role of public funding or public policy to expand workplace charging?

And then third is public charging. I think we all have some sense that fast charging is important, what’s the role of fast charging as Electric Vehicles get mainstream? What’s the role of fast charging? What should be the state’s investment in fast charging, recognizing there’s a lot of public sector interest and investment in fast charging? And then lastly, what other public charging is important for the state to invest in toward making it easier to operate an Electric Vehicle, and also making it easier or building the perception of those that don’t have electric vehicles that it’s actually easy and convenient to own an electric vehicle.

So these are the questions we’re asking today and I want to thank Commissioner Scott and the CEC, as well as the Air Resources Board, which is also working to answer this question, because I think we in the state, and certainly in the Governor’s Office, want a better sense from the stakeholders and the experts on where our investments should be and where our policy focus should be as it relates to infrastructure. We will continue to prioritize infrastructure, but we could do that in a number of different ways. So I think the conversation today will be instructive towards helping us answer that question. So I look forward to participating as long as I can, and then my colleague, Randall Winston, from the Governor's Office will be joining, and I very much look forward to the discussion today. Thank you.

COMMISSIONER SCOTT: Thank you very much, Wade. I would like to notice that Commissioner Karen Douglas has joined us. She does not have any opening remarks for us, so I will turn the mic over to Leslie Baroody, who is the Electric Vehicle Program Manager at the Commission, and she will give us a presentation on the Commission's Electric Vehicle Infrastructure strategy.

MS. BAROODY: Thank you, Commissioner. I can't see you over this, but thank you very much. It's great to see everybody today, I know I've seen a lot of you this week, and we've had quite a few workshops put on by the State this week, so I think we're doing our part to stimulate the local economy, so great to see you here. And as Commissioner Scott mentioned, I am the Electric

Vehicle Program Manager in the Fuels and Transportation Division, and I'm going to talk to you about the Energy Commission's Plug-In Electric Vehicle Charging Infrastructure Deployment Strategy. And following my presentation, Dr. Marc Melaina will give his talk on the assessment.

As many of you know, our office is involved in administering $100 million of the Alternative and Renewable Fuel and Vehicle Technology Program. Our Plug-In Electric Vehicle infrastructure funding is from this program, as well as other alternative fuels and vehicle technologies. This program was recently reauthorized by AB 8 and it is $150 million a year in annual State funding through 2023.

As Wade mentioned, we have a ZEV Action Plan and one of the primary goals of the Energy Commission's PEV infrastructure strategy is really to support the Governor's March 2012 Executive Order, which has a long term goal of reaching 1.5 million Zero Emission Vehicles on California roads by 2025.

There are several 2013 ZEV Action Plan goals related to ZEV infrastructure and planning.

The first is that California's major metropolitan areas should be able to accommodate Zero Emission Vehicles through infrastructure plans and streamlined permitting by 2015, and we think we have a good start in achieving that goal.

Secondly, we need to have sufficient infrastructure to support a million Zero Emission Vehicles by 2020 and 1.5 million Zero Emission Vehicles by 2025.

The ZEV Action Plan also specifies planning actions for the Energy Commission, including of course statewide PEV Infrastructure Plan or Assessment, monitoring of the Regional PEV Plans, and then also facilitation and coordination between the planning regions in California. And we also will be funding ZEV planning activities in local government.

So I'm going to talk about a three-phase approach that we have to infrastructure planning in our strategy. In order to achieve the Governor's objective, we can really look at three phases, so the first phase occurred from 2009 to 2011. At that time, we really frontloaded the EV infrastructure in partnership with the Federal Stimulus Grants, the ERRA Grants, if you recall.

And infrastructure at that time was deployed in the key metropolitan areas of the state to create an EV-friendly environment. Since then, California has really become the center of gravity in North America for EV sales, use, technology development, and manufacturing support. All this progress, of course, involved a lot of collaboration, partnerships with other state agencies, utilities, industry, the PEV Collaborative, regional and local Governments, and others.

So the second stage is where we are right now, and this started in 2011, and this involves continued support of the PEV market. And we did this by continually refining our solicitation process, by developing plans and actions and obtaining regular input from our stakeholders through project data, workshops, and then also looking to academia to provide a lot of great research and input. We wanted to find out what the consumers' needs and wants are and what will move this market forward.

From our very first solicitation, we have been focused on finding the right ratio of residential, workplace, and public chargers to meet drivers’ needs and preferences. Now we’ve evolved to Fast Charger Demonstrations and Multi-Unit Demonstrations, as well as routing our money through our regional planning agencies. Now, we will make adjustments each time we do a solicitation to address the market gaps and encourage PEV adoption.

Another critical phase, of course, is the Regional PEV Readiness Plans that I’ve mentioned, and these really account for the PEV microclimates in each region. Instead of a top-down approach, this is more of a ground-up approach which engages local government and communities and paves the way for everything from streamlining of permitting and inspection processes to detailed infrastructure siting plans. And finally, of course, a very important part of this phase is the development of the Assessment that Marc will talk about later.

So the third phase is going forward and that involves deploying more PEV infrastructure. This is based on refinements to the statewide assessment, refinements to the regional plans, and coordinating between the regions.

I recently read a PEV market update by

the UC Davis Director for the PH & EV Center, Tom Turrentine, and he also noted these three phases and he talked about them as infrastructure experimentation for the Phase 1, and then optimization, and then the third was more of a widespread roll-out, so I guess great EV minds think alike.

So to date the Energy Commission's ARFVTP Program has allocated nearly $38.2 million in grants for the installation and construction of over 8,600 chargers in California. The most recent round of awards were largely coordinated with Regional PEV plans and those included funding for a total of 53 DC Fast Chargers at destinations, workplaces, and corridor locations. So we have now funded a total of 107 DC Fast Chargers. The Energy Commission has also contributed $49 million to the Clean Vehicle Rebate Program, $4 million in additional HVIP funds for Electric Trucks, and $75 million for ZEV Truck Deployment, Demonstration and Manufacturing.

So California built it and they are coming. The early deployment of PEV infrastructure in the key metropolitan areas of

California has really addressed the chicken or egg dilemma at a basic level and along with the rebates, the HOV lane access, the Federal Tax Credit, and other incentives, this has really helped to attract over 83,000 Plug-In Electric Vehicles to California roadways.

So California now has over 5,000 public Level 2 charging outlets representing over a quarter of the U.S. supply, and also 141 public DC Fast Chargers. These numbers change daily and these are from the Alternative Fuel Data Center that the DOE has online.

So in our Phase 1 initial trench of funding, we funded about $16 million in awards to ECOtality, Coulomb which is now ChargePoint, of course, Clipper Creek for the upgrades to our Legacy Chargers, and a few others. This was followed by a $7.5 million solicitation in 2011 for residential, workplace, fleets, and DC Fast Charging Demonstrations. At that time, we really didn’t know a lot about DC Fast Chargers, in fact, there were very few if any available. So we wanted to have a demonstration to collect data and find out more about them. Since then, Fast Chargers have increased from about six in 2013 to the 140 that we see today.

One example of our funding from that last solicitation was a $2 million grant to Green Charge Networks. They're going to be installing a network of 16 Smart Grid Fast Chargers strategically located in and between urban areas and along transportation corridors. These chargers will provide unlimited public access with energy storage at 7-11 stores in the Los Angeles and San Diego area. And there's also going to be two of those, they're finishing up now I think at the 49er Stadium and at a library in Benicia. So we're kind of excited about this project, it will use an energy storage system to minimize the store's demand charges by receiving electricity during the off-peak hours, and then storing it for later use to charge the vehicles.

So I've mentioned the PEV planning regions and, because California is such a vast and complex state, it really made a lot of sense to fund regional plans to address the barriers and adopt regional infrastructure plans that were suited to various land uses, PEV types local objectives, topography, and other factors that affect these kind of plans. Each region has a unique EV microclimate, so one size doesn't fit all. These plans will be increasingly useful as PEV adoption expands to new areas of the state.

Here is a summary of our Planning Grants. Both the DOE and the CEC released solicitations a few years ago to fund PEV readiness, and the CEC made 10 awards for $200,000, six of which were also funded by the DOE grants. One very effective aspect of these Planning Grants was the requirement that each region had to establish a Coordinating Council comprised of four public agencies. So most of these grants, in fact, all the DOE grants are finished, and our grant should be concluding, many of them already done, and this should be concluding by, I think, this fall. And if you'd like to look at more detail on these, we have a summary of all these plans and links to their websites on our website.

This is just a summary of some of the activities in these plans. The DOE awards address the updating of the zoning and parking policies, updating building codes, streamlining the permitting and inspection processes, training of local officials, education programs and outreach to local businesses and residents. And our grant agreements built on this work and also included charging infrastructure, siting plans, strategies to increase workplace, multi-unit dwelling and fleet charging, as well as creation of local incentives to encourage PEV adoption.

So today we're going to have just a little more information on two of the regional readiness plans and after Marc is done we'll have Dr. DeShazo talk about the South Coast Association of Governments PEV Readiness Plan and Atlas, so this plan will assist nearly 200 cities, assess their PEV readiness, and meet demand for PEV charging.

Also, Damian Breen is here to discuss the Bay Area Air Quality Management District Plan. They've also done quite a nice job with this plan, so we'll be eager to hear more detail on that.

So Phase 2 of the CEC's Infrastructure Strategy really encompasses a broader and more in-depth range of activities, as I've been talking about, the Statewide Infrastructure Assessment, coordination with PEV planning regions, Clean Cites, and other local agencies. Solicitations will be increasingly strategic and focused on the needs of the PEV market. This was demonstrated in our last solicitation in April for $11.4 million, and this required that most of the applicants had to be public entities that consulted with Regional PEV Plans. This ensured compatibility. These were awards for destinations, workplace, public corridor, and multi-unit dwellings and included 53 DC Fast Chargers, and it was also over-subscribed by a factor of two and a half, so quite popular.

Also, the 2014-2015 Investment Plan allocates $15 million for EV infrastructure, and this has almost doubled previous allocations, certainly a strong signal to the market and the fact that ample funding is available for leveraging other resources. And finally, we are continuing research on PV-related issues such as Battery Second Use, Recycling, and Vehicle to Grid.

So we’ve been quite busy. Leading on these efforts, we’ve been involved in the ZEV Action Plan efforts, as Wade mentioned, developing the Statewide PEV Assessment, and this began with a workshop that we held in January of 2013 with probably many of you here today. That was, yeah, a while ago now, but it was a very effective workshop and it served for the basis of a lot of the assessment. On the left is a snapshot of our webpage and a lot of documents can be found on there from various workshops and we encourage you to look at those. On the right is just a snapshot of one of our breakout sessions from our Statewide PEV Planning Workshop.

We've also hosted a series of monthly meetings with all the regional planning groups and we had a series of regional coordination webinars addressing the topics of their choice, so those were also helpful.

Here is a summary of some of the PEV-related research we're conducting. I won't go into a lot of depth on that right now, but we're having I believe a workshop coming up on June 17th that will be talking about the EPIC grant solicitation process.

Finally, in Phase 3, we'll be deploying additional infrastructure based on updated statewide and regional plans. We'll be gathering and analyzing the consumer preference and behavioral data, the charging data information through stakeholder workshops, just to refine all the assumptions used in the assessment. And then the Energy Commission will be following up with each of our 10 planning regions just to monitor their implementation of plans and facilitate lessons learned with regard to infrastructure siting.

And we're also going to be developing a Statewide Intraregional DC Fast Charger Plan, and we'll be working with NRG's eVgo, regional plans, and various other entities that are deploying infrastructure. We want to make sure the gaps are filled and that drivers really have range confidence. And this includes prospective buyers. So we'll be looking at all the gaps between regions and between states.

We expect that the outcome of these activities will be an increasingly strategic, comprehensive, and dynamic plan for future PEV infrastructure deployment in California. And we look forward to working with many of you.

So that concludes my presentation and I would just thank you for your attention. I would like to introduce Dr. Marc Melaina at this point with the National Renewable Energy Lab. He is the author of the Assessment and a Senior Engineer. Welcome, Marc.

DR. MELAINA: All right. Thank you, Leslie. And good morning everybody. I'm going to walk through our assessment report. My name is Marc Melaina. I work at the National Renewable Energy Laboratory (NREL), and we have copies of the report available here.

I'm going to do a couple quick slides on NREL as an organization, briefly summarize the purpose of the Statewide Assessment, and then I'm going to go into a fair amount of detail on the methodology of how we did the quantitative aspects of the assessment, and then a little bit about how in the assessment we conveyed the use of this framework, the assessment framework for the Energy Commission, into the future.

If people don't know about the National Renewable Energy Laboratory, it's one of the U.S. Department of Energy's large energy laboratories, we're actually the smallest one, but we are focused specifically on energy efficiency, renewable energy, we're in Golden, Colorado, so we are owned by Department of Energy and operated by the Alliance for Sustainable Energy. The scope of NREL’s mission cuts across energy efficiency in different sectors –- buildings, vehicles, all the different types of renewable energy, as well as systems integration and market growth, and the near-term deployment of renewable energy/energy efficiency technologies.

So Leslie already talked a little bit about the Assessment. We are describing this as one of the first analytic frameworks for a statewide assessment of EVSE infrastructure. It shows how we can roll out sufficient infrastructure to meet the ZEV Action Plan Goals, specifically the goal to support one million ZEVs by 2020, anticipating growth through that time period up to the 2025 goal.

So some of the things that the Assessment covers. It articulates the Energy Commission’s conclusions, recommendations regarding infrastructure that you will see here if you look in detail. I don’t know if I have a pointer here, but -- thanks. It’s myself and my colleague, Mike Helwig, are authors on the report, but really we had a lot of input from a lot of people, especially I want to say the workshop that Leslie mentioned where we collected a lot of initial input on the scope of the overall assessment, and then ongoing input from various people that we reached out to and who have reached out to us while we put the report together. So I think that's the last bullet here.

So let me go into a little bit of the high level summary results before I go into the methodology. This is just a simple table showing the number of chargers, this is just focusing on the quantitative aspect of the assessment, the number of charge points by location and type in 2020 to meet the Action Plan goal. We have two different scenarios on these two rows, the Home Dominant Scenario where most of the kilowatt hours are provided through home charging, and then the High Public Access Scenario is the second row that shows the infrastructure required if a much larger fraction of the total kilowatt hours is provided through public charging. And I'll go into detail on these, but these are some of the high level numbers. Let me just point out that these two columns here, Level 1 (L1) and Level 2 (L2) Home, you can see the difference here is really more in the Level 2; Level 1 and

Level 2 Work, again, differences in Level 2; Public/Commercial EVSE, acknowledging that some workplace will also be public, but in this category you can see the difference again is fairly significant on Level 2, and then a wide spread for the Fast Chargers between the two scenarios.

So this is the high level summary. If we go down another level, we have this broken out by planning region for both of the scenarios, so this top box is the same number is broken out by region, or planning region in the home dominant, and the lower panel here is the high public access scenario, the same numbers as on the previous slide.

Similar results that we want to show visually for people who would rather get a visual summary, this is just an example of the next slide I'm going to show to walk through this. This shows the work and public chargers, Level 1, Level 2 Work, the number of units on the horizontal axis here where the blue is the home dominant scenario, where you're on the lower end of the spectrum. Most kilowatt hours are provided through home charging, so there's fewer work chargers. And the orange, that would be the high public access or more kilowatt hours, therefore more unit charge points required in that scenario. Same color spectrum here, Public Level 1, Level 2, and DC Fast Chargers (DCFC). And this would be for the Capitol area projecting electricity demand for that 2020 goal, equivalent to 51,000 Plug-In Electric Vehicles. So it's not saying that they would be deployed by that time, but that's the measure of meeting that 2020 goal is to fulfill the demand for a million vehicles, a million ZEVs.

So if we take that same diagram and break it out to all the different planning regions, we get different sizes of circles for the projected demand for the different vehicles, and then those same bar spectrums from blue to orange for the two different scenarios. So let me just check to see in the audience if that makes sense to people. I don't see a lot of heads nodding. Does that make sense? Okay.

So let me go into the methodology, a little bit of how we came up with these two scenarios. One important note is just on the general approach of a scenario analytic framework in general is that from the beginning we really tried to find out if we had enough data to do a more predictive model to sort of forecast a central future of what would happen to meet the ZEV Action Plan goal. One of our conclusions is that we do not have enough sufficient empirical market data to calibrate that type of model out to the 2020-2025 timeframe. So we’ve used a scenario approach to try and do bookends on what we think are the important parameters, understanding there’s a lot of uncertainty about future market trends and investment trends.

So if we do those projections, we do have an analytic basis that is common between the two scenarios and a lot of that is simply the demand for the number of vehicles. So these bullets here for high level numbers shows total electricity being, in a simple expression, total miles driven, the efficiency of the vehicles, and total kilowatt hours required to keep those vehicles moving in that 2020 timeframe. This would be 900,000 Plug-in Electric Vehicles with the other 10 percent for our trajectory being hydrogen vehicles to make up that total one million ZEVs in 2020. And there are a mix of vehicle types, but approximately 20 electric miles per day. Given that demand for total kilowatt hours, the scenarios start to diverge in the way that we supply that electricity to the vehicles, the type of infrastructure is distinct in those two different scenarios, but the underlying demand is the same.

And an important point, I know a lot of people want to zero in on these numbers, this is really a dynamic snapshot of what would happen in time to meet the ZEV Action Plan goals. It would be a rapid expansion of both vehicle deployment and infrastructure. So try not to think about this as a static, you know, what one infrastructure would look like, but rather a window that we would be moving through a the market grows, increases over time.

So just to emphasize the dynamic nature of the scenarios, for the underlying demand this is our extrapolation of a compliance scenario from the Air Resources Board for the ZEV Mandate. Light Truck, Passenger Car Sales for Fuel Cell Vehicles, Plug-In Electric Hybrid Vehicles, 20-mile batteries, and then the way we modeled it similar to what they did, and a simple way is

100-mile Battery Electric Vehicles. You can see those broken out as sales on the left and then as the stock of vehicles accumulating over time, understanding that some of them will be retired and new vehicles we purchased over time, we took into account improvements in vehicle efficiency to do the overall demand, so we have a full stock model of the light-duty vehicle sector to come up with these demands.

You can see a couple of different important time periods here, so half a million ZEVs by about 2021; shortly after that on this trajectory you would get to a million ZEVs by 2023, 2024, in that timeframe, and what we’re modeling in the assessment is that 2020 goal of having sufficient infrastructure to support a million ZEVs, and so you can see how we’re really moving through this quickly so the 2020 numbers are really, like I said, just a snapshot.

One of the important things is to understand this demand regionally and how it’s broken out regionally, so we have an Early Adopter metric which we don’t consider an accurate forecast, but we consider it an interesting and relevant proxy for more sophisticated market adoption models that are being developed and will inform us in the future. But this metric helps us break out where those vehicles would be across the different regions for that 2020 snapshot. And I'll talk a little bit more about that in a later slide. So I've come to convince myself that this is the most important diagram in the assessment. This is an attempt to simplify all the different factors that went into the two different scenarios and it really defines the scenario approach.

So we have two different trends here, acknowledging that there are a lot of different factors that are going to influence the market, influence the types of investment made in EVSE infrastructure, and vehicle trends, these are the two that we tried to highlight as being the most critical for how we've defined the two different scenarios. On the Y axis, the vertical axis, we have conceptually Consumer Demand for Public Charging being low down in this quadrant, or high into the future, and this is from now up until 2020-2025, so two different ranges on that spectrum of Consumer Demand for Public Charging. If consumers are more satisfied with home charging, they would be down here, if there's a clear evidence for demand for public charging, this metric would be up here.

On the horizontal axis, we have a different important metric which we describe as the Total Benefit to EVSE Suppliers and Installers when there's increased public access, so whoever benefits from that, and not just through sales of kilowatt hours, but from foot traffic, green image, multiple different ways that different people, part of the supply system would benefit. If that benefit materializes in the future to be relatively low, we would be on the left-hand side; if it's relatively high, we would be on the right-hand side. So that leaves us with two of these quadrants that are bookends on the amount of infrastructure that would be required to meet that 2020 goal. If both of these metrics are low, we're in the home dominant scenario, so public access is low relative to the next one, cost to consumers is moderate. On the other extreme where both of these trends are high, we have the high Public Access Scenario. Relative to all these others, the Public Access Availability of EVSE is higher than the other four quadrants. The cost to consumers, again, we describe as moderate, to make the distinction between these two other quadrants that we don't consider as scenarios, we don't model them explicitly. So this is a conceptual framework for understanding these trends and the way these two scenarios relate to each other.

So I'm going to talk -- and the Assessment goes through the Home Dominant and High Public Access Scenarios. There are potentially many many slides that I could show for the exact numbers of the different inputs, this is a high level review of the types of inputs that go into the calculations. We have the capacity of the different types of EVSE, the number of charge points per station, the charges per charge point per day for this fleet of vehicles that we've projected, the kilowatt hours of demand that we've projected into the future, and then the efficiency of the vehicles gives us the number of miles supported by that electricity for each vehicle. How many stations falls out of that, the different types, the different locations, and then as I mentioned, we have demand broken out by planning region, so we have the results also geographically.

One view of the inputs and the result of the quantitative framework we can show in terms of the percent of total kilowatt hours supplied to these vehicles, again, the demand is the same between the two scenarios, but in the Home Dominant, we see about 85 percent of the kilowatt hours being supplied through Home charging, 12 percent Work, three percent Public, and then we have that broken out by EVSE type.

In contrast for the High Public Access, the Home fraction drops down to a 70 and it's made up by increases in the total amount of kilowatt hours provided by Public Workplace Charging. So this is a nice visual way to see the different numbers that we have in tables, numerically in the report.

Let me just point out if people are looking for it, the DC Fast Charging (DCFC) is the white sliver here as part of the red triangle for the total fraction of kilowatt hours provided. And that underlies the total number of units, charge points for that EVSE type.

So hopefully people can read these numbers. Okay, there are a few extra symbols in there. This is a little bit more detail on the Early Adopter metric. As I said, this is a proxy for a more accurate forecast of vehicle adoption in the future. What we have taken into consideration here is the empirical data by region based upon Polk data, so Historical Vehicle Sales for Hybrid Electric Vehicles as a signifier of people who would buy green vehicles, and then we also weighted the Early Adopter metric by household income, saying that households with higher income have more disposable income, that are a little bit more willing to take technological risks, and then the other one is luxury vehicles where we see people are willing to allocate resources from their household to vehicles as one of their assets. So those are the three things that we put into the Early Adopter metric. What happens when you do that is you deviate from this dotted line. This dotted line would be allocating vehicles simply by population, and so for urban areas, metropolitan areas with a higher early adopter metric, they get greater share than if it was just allocated by population. For regions, urban areas that are low on that metric, they’re below that dotted line.

UNSPECIFIED SPEAKER: Has this been used anywhere else? Or did you develop this originally from this --

DR. MELAINA: We have used it in other simple scenarios. We've used it just generally for Fuel Cell Vehicles, just sort of on vehicles where we did not have enough attributes of the vehicle itself to match up consumer preferences with vehicle attributes, so we have used it in the past for that reason. And we do have analytic models, and other people do, where we project the attributes of the vehicles, we project the attributes of the people, and then we line those up in a more sophisticated way. So this is sort of a step towards that is the idea.

Okay, another explanation of the methodology here: what we've done to come up with these numbers, I have a couple of equations, but I think it's easier to understand them conceptually, is we've matched two different ways to calculate the number of charge points, number of EVSE stations. One is based upon the capacity and one is based upon the kilowatt hours, so there are two separate equations. We know all the inputs for those. If we set them equal to each other in Excel, this is done in Excel, it’s a goal seek function, when those equations equal each other, then we have the total number of units equivalent based upon a consistent representation of both capacity and kilowatt hours. Hopefully that sounds familiar to some people who have done this kind of modeling before.

This figure shows both of those values where we have the demand in one of the scenarios for one of the EVSE types increasing, this is hours in a day, demand increasing and then dropping over the day. I believe this is workplace charging -- does it say on here? I believe this is the Workplace Charging Demand Scenario. That is the total demand for vehicles by hour. The capacity of charging infrastructure required has to exceed that peak, so that’s where the capacity equation comes into play. You have to have some buffer there. This is a typical day, so this is average, but there’s going to be some statistical variation of what actually happens on any given day in a year, so we need a buffer here and we have tried to adjust the different parameters so we have a different type of buffer for the different types of charging, recognizing that some of them are going to be more consistent and lower variability, and some of them, I think especially public charging, are going to be a little bit more sporadic and might vary on holidays and such when we see a wider range. So we would have a greater buffer capacity there for that supply type.

The area under these is going to be the kilowatt hours supplied. So that is where we have to set those two equations equal to each other, both the capacity for the supply infrastructure, and the total kilowatt hours demanded by those vehicles. So conceptually that really describes the whole analytic framework; we've done this for all the different EVSE types, locations, all the regions, and that all rolls up into meeting the 2020 goal for one million ZEVs. I saw a couple of people nodding heads there, so I'm going to go on.

This is described in the Appendix of the Assessment, I don't think I'm going to go through it in detail, but just so people can see if they're wondering what those equations actually look like. "N" is the Number of Units, and here this is the Capacity Equation -- no, this is the Kilowatt Hour Equation, so "Q" is the total electricity provided, and we have a fraction splitting out the electricity by the different types into the different vehicle types, and then this is the buffer capacity -- actually, I think I was wrong, I think this is the Capacity Equation, it says so on the slide, people. I'm catching up with all of you. Okay.

The next equation here is the Kilowatt Hour one, so again we set these equal to each other, the "N" is the same value. Here we have a different set of metrics, we know all of these, we know all of these on the previous one, except one set for each one we set equal to each other to solve them simultaneously. So "D" is going to be the percent of electricity provided during the peak hour, so that would be this fraction. I'm trying to see who asked that question. Does that make sense? Okay. So that's how we estimate the peak demand and then we have the buffer capacity to make sure we're exceeding that by a certain amount.

UNSPECIFIED SPEAKER: What assumptions

are made about charge rates on both the charge side and the vehicle side?

DR. MELAINA: We have those being consistent between --

COMMISSIONER DOUGLAS: So just to break in quickly, the WebEx doesn’t pick up the question, it only picks up your answer, so if you answer in such a way that the question is clear to someone listening, that would be helpful.

DR. MELAINA: Great, thank you. So the question again is the rates –

UNSPECIFIED SPEAKER: The charge rates on both the vehicle side and the charger side, how did you account for the shifts that are going on?

DR. MELAINA: Right. So we basically assumed that the chargers in the future would be similar to what we have today. We tried to have them approximate what we get out of the EV project today, so we didn’t try and extrapolate out to a significant degree. So really in that sense it’s a little bit of a business as usual for the technology. So that would be easy to modify given that the assessment or the framework is set up with those as inputs. But those were input assumptions.

COMMISSIONER SCOTT: Dr. Melaina, let me suggest that -- I think there's probably a small handful of people that are very into sort of the details and each piece of the methodology in how the calculation was put together, and I think that might not be appropriate just for right now. What I'd like to do is suggest that you tell us more some of the higher level conclusions; and then I recognize that this is a lot to digest, so for people that are really into sort of the methodology and the nitty gritty of how everything was calculated, what we may be able to do is set up another WebEx as sort of a separate more technical WebEx where we could really dig into some of these details, but I think for today's purposes, if you can tell us more some of the higher level messages in terms of what your study found, and then what you think the next steps are, I think that would probably be good for most of the audience.

DR. MELAINA: That sounds great.

COMMISSIONER SCOTT: Okay, thank you.

DR. MELAINA: I appreciate it. And if anybody wants to send me an email with questions, that's another way I'm happy to respond.

COMMISSIONER SCOTT: Thank you.

DR. MELAINA: So going through those for the different types, the way we've broken out the electricity demand, this is what we see in terms of the demand profiles for the two different scenarios, for Home demand, Work Demand, and Public demand. So this is in megawatts and you can see the variation where Home demand drops when you move to high public access, and Workplace and Public charging increases when you shift from left to right. So that is a high level summary of the nested set of equations that I was describing on the previous slides.

So there are a lot of different variables here. I think one important point is that if we change one variable, we have to make sure that that change is consistent with the way we've changed other input assumptions. So a lot of this we shouldn't describe as an optimization framework, that's not what it is; really, it's a set of equations that work together that we've tried to calibrate all the different inputs to be as consistent as possible, and if we wanted to change one of the inputs, we would have to consider the effect of that on all the others.

And one way to break that down is to talk about the demand metrics: what are the vehicles going to look like, how are they going to charge? And then the supply metrics: what does the infrastructure look like, what are the spatial coverage requirements is one of our metrics, what do those have to look like? If you change one, it’s going to influence the others. This is an overall energy capacity balance equation, so you have to consider both the demand and the supply side metrics.

So I think I’m almost done here. I think just listening to Leslie earlier, an important next step that I didn’t put in these slides is ingesting and trying to reflect and learn from the different numbers that flow out of the regional plans to improve this assessment, so that’s one of the next steps I think is really important. We have the framework set up to do that already, and by integrating that bottom up, you know, very thoughtful regional data, it will make this framework much more robust and in some cases it will probably introduce metrics that we had not accounted for that can improve the framework overall where we change the structure of the framework as well.

One of the other things that we highlight in the assessment is in terms of an adaptive management strategy, as we see market trends materialize, cost trends materialize, consumer preference trends materialize, we can adjust the framework accordingly based on that empirical data, or, say, projections from models that we think are very robust, we can change these different metrics.

In terms of planning as an adaptive management activity, one of the things that we talk about is identifying differences in the market geographically, or by different market segments, say different household segments. If there appears to be a lack of market growth due to EVSE availability, we could see that relative to the other areas; where there’s sufficient EVSE availability, market growth appears to be taking off, all other metrics are relatively the same, so we are trying to isolate that as a barrier to market growth and so that would help guide investment decisions.

In contrast to that, and going back to the sort of supply and demand metrics, if we see an area where EVSE availability appears not to be the limiting factor and maybe it’s vehicle support, consumer awareness, things on the vehicle demand side, or sales side, then we would try and recognize the type of changes or support structures that we would focus on that particular geography or market segment. So that’s one of the ways that we talk about using the Assessment as an adaptive management tool.

And I think that’s it. Do I have time for questions?

COMMISSIONER SCOTT: Well, let me suggest that what I’d like to do maybe is have Leslie Baroody come up with you and perhaps Commissioner Douglas, or Randall, or Wade have some questions for you. And then I’d also like to invite our panelists if you would like to come on up to the table and join us here. And you know, I don’t want to get into a more in the weeds discussion on the methodology right now just because there’s a certain sliver of people who will really enjoy that, and the rest of the folks may not, but I think for some of the higher level pieces it might be helpful for you to just kind of tell us again a couple of the conclusions -- or maybe "conclusions" is too strong of a word, but what I think is interesting is showing across the state how much infrastructure may be needed. I think you raised a really interesting point in terms of even in the high public access scenario, you still have home dominant because that's where we anticipate most folks will be charging, and maybe if you could hit a couple of those sort of higher level points for us again so that people can hear those because I know it's a lot of information to digest and that folks probably haven't had a chance to actually read the report in detail. And then maybe when you're done with that, we'd have Leslie talk a little bit about, again, how that fits into what the Energy Commission is doing and planning to do next. And welcome, panelists. Thank you for joining us.

MR. CROWFOOT: I have one question, probably not for Leslie and Marc, but that their analysis spurs, which is what is the future of public investment as the public infrastructure expands? You know, it seems like the 2009-2011 phase of experimentation totally makes great sense for the public to invest because, you know, market demand wasn't there, there wasn't a way for charging infrastructure to make money. Certainly this sort of most recent second phase of optimization, same sort of thing. But then when you look at the numbers in terms of the thousands of chargers that are out there, you know, we don't have a sustainable funding source at the state if you look at even AB 118, some portion of AB 118, even if you had $20 million, you know, public investment would not cover the numbers up there. And so that's one question is, you know, when does Government start to tiptoe out of the investment in the public infrastructure? And maybe that's just a question to pose and maybe the panelists can address that in the course of the dialogue.

And then secondly, you know, to what extent is infrastructure a government planned enterprise? I know we have ChargePoint, for example, you know, utilities interested in playing a role. And so I think, while the analysis is instructive to better anticipate where there may be gaps, but at what point does the market take over in terms of identifying where charging goes? And at that point, it doesn't seem like it's tremendously productive for government to continue to try to plan where it should go. So that's just two questions. One is, you know, public investment is necessary for how long; and then two is, to what extent can government plan where locations are optimized?

COMMISSIONER SCOTT: I'm going to suggest that we think on those and talk about them as we get to our panel discussion.

DR. MELAINA: Okay. Maybe I can talk about some of the high level results, to emphasize those, and this does tie into what I think is an important point that Wade made about Government pulling out eventually in terms of offering significant support.

Just to give people a little more perspective on the scale of what we've modeled here, this is new vehicle sales on the left and this is ramping up through 50,000 per year, up to 200,000, up to 400,000 per year. And if that increase over time as laid out in our goals is achieved in that compressed period, this would not be leveling off here, it is the opposite of leveling off. This is rapid growth that continues and eventually plateaus at some point. So this is not only large in scale, but it's large as a moving target, the amount of supply infrastructure that needs to be put into the ground to keep pace with this is tremendous, and so this snapshot of these numbers by region for public infrastructure, Fast Chargers, Level 2, at this point in time we see availability especially on public access that is in some ways comparable to gasoline, so as a fully-fledged infrastructure supporting a growing market it's I would say on order of magnitude whatever the right multiplier is beyond what we're looking at now in terms of next few years, the amount of support needed here can't possibly be shouldered by Government in a major way, so just to make that point.

COMMISSIONER SCOTT: Leslie, do you have anything to add?

MS. BAROODY: So I would just say this is very helpful for kind of a baseline, you know, where do we start analyzing where we are with infrastructure deployment? So we're off to a good start here. In coordination with the regional plans, I think this helps provide another number for the regions to look at to compare their numbers with these numbers. Marc is right, we're not going to be able to fund all infrastructure going forward. But we do have funding that we can leverage and we want to find the best ways to leverage and where we can fill the gaps where a private industry will not be able to fill those gaps for lack of a business case, or whatever. If we look at Fast Chargers in intraregional corridors, maybe in areas in the state where there's not going to be much of a business case. That may be a place for the Government to step in and provide those Fast Chargers. So I think it's important for us to continue to monitor ZEV infrastructure deployment to see, you know, what is the remaining demand? How do we know we've satisfied demand? And I think those are some of the things we're going to discuss today is to figure that out. But overall, this is going to be very helpful, too, as we plan our Investment Plan allocation for EV infrastructure deployment. We just want to have some better metrics to look at when we're allocating money to this area, so I think this will be helpful for that, as well.

COMMISSIONER SCOTT: Thank you very much, both to Leslie and to Dr. Melaina. I know that we wanted to hear from some of our regional folks and, Leslie, I think you're going to introduce them?

MS. BAROODY: Thank you, Commissioner. So we don't have Dr. DeShazo in the room today, but he is on WebEx, I believe. Dr. DeShazo is the Director of the Luskin Center for Innovation at UCLA. He is also Professor and Vice Chair of the Department of Public Policy in the Luskin School of Public Affairs at UCLA. Dr. DeShazo, he's been here for previous IEPR workshops and we're just appreciative of his time today, and I'd like to welcome him now.

DR. DESHAZO: Good morning. Can you hear me?

MS. RAITT: Yes, we can hear you.

DR. DESHAZO: Okay, wonderful, just wanted to confirm that. Well, thank you all for inviting me. I think Damian and I have exactly seven and a half minutes apiece to cover what are essentially 200 to 300-page documents.

So what I'm going to do is just focus on a couple of highlights and the highlights of the Southern California Council of Governments Plan really involved and focused on the question where should we be targeting deployment of charging infrastructure for each of the subsectors: Workplace, MUDs, Commercial Retail and, to a lesser extent, Public.

And so the first thing that I want to do is talk about the demand for charging and how the demand for charging varies over the course of a day and how for any given city the demand for charging is going to depend quite a bit on the land use that’s in that city, and where the Electric Vehicles are.

And let me just say that the goal here is to identify at the parcel level where promising candidates are for the installation of infrastructure. And then the second thing I want to do is pull the lens back and just mention very briefly how at a regional and a city level we can use very standard land use planning tools to help assess and prioritize outreach, both across cities and then within a city, across parcels for particular kinds of land uses.

So the first example I’m going to give you is going to be sort of illustrative from our PEV Atlas and I’m going to focus on one Council of Government, the West Side Cities, and it contains Santa Monica, Beverly Hills, West

Hollywood, Culver City, and Marina Del Rey, and what I want to illustrate is the importance of understanding the demand for charging and the ability that we all have who live in major cities to model travel dynamics using existing tools that have been used for transportation planning and apply those to PEV infrastructure planning, and show you that we can estimate PEV density by time of day in these different environments.

So the first map that you have here, you can see Santa Monica in the bottom left, Beverly Hills is in the upper right corner, and this is actual data on the registrations of PEVs in these neighborhoods, in these travel analysis zones, overnight. So we know where these vehicles are at night and we can update our knowledge of them and we can forecast, you know, market penetration. But this is actual data for this particular COG.

And what we’re able to do is take this basic information and then feed it into the Regional Travel Models that SCAG very generously provided us with. And with that travel model, we can predict where each of these vehicles go during the day. So we can think about the demand for workplace charging spatially and how vehicle travel is going to change the density. So what you see is a very predictable shift in Santa Monica to the Center City and then Beverly Hills to the Golden Triangle up in the right-hand corner, and we've been able to validate these PEV densities by looking at corresponding charge utilization data in these areas and confirm that, indeed, this is where vehicles are moving. For the workplace charging, we can then take parcel level data on businesses, by size of employees, and we can overlay the business locations knowing exactly who these businesses are with where the vehicles are, and begin to develop a priority list of employers to reach out to.

So, this is one of the goals is to overlay demand data with parcel data, and identify a candidate list of targets. A similar thing could be done with commercial retail charging, so these are the shopping centers by type in this Council of Government area, and we can overlay the mid-Bay destination, so this is noon to 6:00 and, again, identify where the vehicles are and where the commercial retail outlets are that are in those high density areas.

Similar things can be done for MUDs, I'm going to show you an example of that in just a minute.

And then, of course, to make sure we're filling in gaps, we can map existing charge stations there. And we did that -- I just showed you the Westside Cities COG -- we did that for 15 COGs at that level for the entire region here in Southern California. And let me just give a shout out to the South Coast AQMD and to SCAG and to LA County for their support in this process, and the Council down here were just fantastic.

We also predict growth and demand, I'm not going to focus so much on that. The last thing I want to focus on is this question of where we should be deploying our investments. Really, it forces us to ask, well, do we want to invest in MUDs? Do we want to invest in workplace charging or commercial retail? And at the regional level, what we might want to understand is which cities have different types of land use hosting capacity.

So the example I'm going to take you through very quickly is just MUDs. One of the biggest challenges, one of the biggest constraints on the market currently, at the regional level SCAG might want to know what cities offer the greatest bang for our buck if we invest in permitting reforms for MUDs. And so what they really want to know is count data on how many MUD residents there are in different cities. Cities, on the other hand, kind of want to know what share of their land use is devoted to workplace versus MUD versus single family versus commercial retail. And so they're interested in sort of share analysis by land use. And of course, everybody ideally would like to have parcel level analysis.

So one of the things that I want to emphasize when we get down to the Regional level is, as Leslie said, we have over 200 cities. Some of our cities have a significant number of MUDs, some of our cities have no MUDs; some of them have no employees, some of them are -- over 65 percent of all the individuals at noon are employees. And so there is tremendous variability across cities in the land use hosting capacity for different charging infrastructure opportunities. And that's the most important thing I want to emphasize here. And you have to know that if you're going to begin planning and prioritizing these investments.

So we can see Hawthorne has 40 percent MUDs, Rolling Hills Estates in Rolling Hills have less than two percent. So these shares are going to help you understand what cities themselves are going to think about how they're going to prioritize their need, but it also helps in Metropolitan Planning Organizations like SCAG to target their resources, depending on whether they want to focus on workplace, or MUD, or commercial retail. And so SCAG, I would argue, is probably going to be most interested in MUD counts and not for share, because they want the biggest bang for their bucks. They can go to Torrance and reform their permitting process and benefit 22,000 MUD units, for example. They probably shouldn't be focusing on the Rolling Hills and so on and so forth.

Second, the question becomes at the parcel level, how do we target, let's say, MUDs? So this is another COG, this happens to include Compton and the South Bay, and one of the things you can do is you can look at these high density residential locations that represent areas where single families have purchased these homes, and you can identify the MUDs in those neighborhoods. And you can identify the vintage of the building which tells you a little bit about maybe the cost of installation and the value of units, and you can target specific parcels. You know, again, targeting those MUDs that are in locations where we know are attracting high densities of PEV owners already. And then I just want to emphasize, this can be done for workplace charging, it could be done for commercial retail charging, and we do it in our sub-regional analysis for the South Bay and Western Riverside, so if you want to see examples of this really high resolution spatial analysis that's available.

Thank you guys very much. You know, the plan also covers all of the requisite elements to that focus on driving down soft costs, but I thought that's something that all the plans cover, so I wanted to feature these aspects. Thank you for having me.

MS. BAROODY: Thank you, Dr. DeShazo. You did a great job in seven and a half minutes, appreciate that.

Next up we have Damian Breen. Most of

you are familiar with Damian, probably. He is the Deputy Air Pollution Control Officer for the Bay Area Air Quality Management District. He heads up the Innovation Section on 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. Welcome.

MR. BREEN: Thank you. So this morning we're going to concentrate again principally on the planning and siting analysis that we did as part of a Regional Plan.

Because the time is pretty short, I'm just going to skip over most of the introductory stuff. But what I was going to just stress for folks is, you know, we are the Bay Area Air Quality Management District, you know us, you love us, we're here to protect and improve public health, air quality, and global climate. And that's the reason why we're involved in Electric Vehicles. Forty percent of our greenhouse gases and 50 percent of our air pollution comes from vehicles in the Bay Area, and in the second densest metropolitan region in the United States, you can understand why that is a problem.

So as we approach this, we actually were one of the main reasons why the DOE funding came to the regions in the state to do this planning, we provided the match funding for the state to get the first phase of this planning, and what you see here in front of you is the combination of the Phase 1 and Phase 2 planning that was performed as part of both DOE and CEC efforts in the Bay Area.

And today we’re going to focus on the charging element. As you can see here, we have the EPRI charging triangle and we have on the other side a map that basically -- you can’t really see it here, but when you blow this up in detail it shows our main travel corridors, and for where electric vehicles are traveling in the Bay Area. How do we know that? We know that because, as part of our funding we require our Grantees, and those are folks that have received residential charging grants from us, and folks who have received vehicle grants from us, and folks who are deploying both public and residential charging information to report their data to us.

We like this idea of high public access

versus home dominance scenario because we've actually experienced that in the Bay Area. When we got our first vehicles, we got about 1,400 vehicles that we're kind of monitoring on an ongoing basis, and we saw that the Home Dominant Scenario was where charging was concentrated, and we had about 80 to 90 percent of our charging happening in the home; but as our regional network got deployed in the period from about 2011 forward, we saw that that trend actually reversed and folks started to increase their vehicle range and vehicle miles traveled more significantly as the network rolled out. This is important because it has led to a scenario now where we have the high public access basically in the Bay Area where folks are traveling farther, doing more vehicle miles traveled in their Electric Vehicles because we have that charger net.

But there are a couple words of caution there. If technology changes, if vehicle ranges increase, this scenario will probably reverse back the other way. So as we look at these things, we have to consider that as we deploy our funding.

So as part of our regional plan, and I wanted to highlight this because I think it provides something that's very interesting, we projected vehicle sales and vehicle forecasts and in the Bay Area we're looking in order to achieve our goals for our Sustainable Communities Strategy and for our commitments to the Air Resources Board of about 250,000 vehicles by the year 2025. And you will see that our charging analysis here for the year 2025 comes out to be roughly around a little over 20,000 publicly deployed Level 2 EVSE in the low use scenario, and a little bit over 45,000 in the high use scenario. If you compare those to the NREL numbers, they're virtually identical. So not bad for not professionals, right?

So I think we're feeling fairly comfortable that these are in or around the ranges of EVSE deployment that we need in the Bay Area. Another part of our analysis, I think, that's important to show is if you look here at the map on the left, basically what you're seeing is any areas in the blue, kind of light to high blue, are the areas that we've identified using a couple of different methods using the data that we have from our vehicles and chargers, and the information from our local travel demand models to show where are the areas and where are the corridors that we need charging.

In order to really focus in, you begin to see the charging that were developed along the Bay Area highways, and then you see where we've provided funding and where others are actually starting to put the vehicles in. So if you overlay those maps, you can see that currently the 1,700 Level 1 and Level 2 Publicly available EVSE we have and the 60 DC Fast Chargers, they're all located along those corridors and in line with that travel pattern. So we are matching it up. You know, in terms of our funding, we are trying to stick and go with this plan, but others, I think, are figuring this out, they're putting the vehicles and they're putting the charging where the demand is.

Currently in the Bay Area, we're in a situation where we estimate we've got roughly around 30,000 PEVs, and contrary to kind of the trend that's developed in the state, we're in a situation I think because of our density where we're seeing about 60 percent of our vehicles be battery electric versus the plug-in hybrids’ 40 percent.

So that again represents about 36 percent of California’s Plug-In Electric Vehicles, and as we look at this map, and as we consider it, there are a couple things that it is informing: as we look at the trend, we look like we’re pretty much on a trend there to achieve the goals that we want to achieve, and you can see on the track there, we’re pretty much in the ramp-up stage that we need to be. We’ve seen some interesting information come out from the Luskin Center around charging for Electric Vehicles, what that information has told us is basically a lot of this EVSE, when it was initially installed, was free. As we begin to actually charge and put a monetary value on charging, the number of actually necessary publicly deployed EVSE actually goes down and we end up with a ratio of about 1:10 publicly available chargers needed. So we feel like we’re on a good trajectory in our region.

In terms of what we are doing, we are following the investments that were dictated in our local plan. We are looking to provide rebates for public agencies for vehicles. We are also investing in a corridor charging project, DC Quick Charging Project, that follows those lines and those trends, but we are beginning to move away from the publicly available charging. We feel like that's a market space where private industry can do a better job than government making rules and trying to dictate how the network is going to grow, but one of the key areas that we are concentrating on now is workless and multi-family dwellings. We feel that that is the area where we need a lot of help in the Bay Area. We feel that because of the extensive deployment of DC Fast Charging, the efforts that NRG are going to undertake and some efforts that we are going to undertake with the Energy Commission, that we're on a good pathway there.

So as you all look at this and as you consider this, I think it's going to vary region to region as to what the investments that we would consider to make would be. And as you think about this issue, you do have to factor in the fact that, you know, if scientists in other places are to be believed, a certain group of gentlemen in Japan, we may be on a path where you begin to see a reverse in that trend to that home dominant charging scenario based on the fact that battery and other technologies are going to change. So I'm going to leave it there and I'm happy to answer any questions.

COMMISSIONER SCOTT: This is great. Thank you so much. I know that was a short amount of time, but it's just a really great set of information and a good flavor, I think, both from J.R. DeShazo and Damian, from you, about the power of the regional grants in having the regional work onto this, so thank you. What I'd like to do maybe is make a few remarks -- unless you had questions --

COMMISSIONER DOUGLAS: I don't think so.

COMMISSIONER SCOTT: -- okay -- is to make a few remarks and then we'll transition into our panel, which I have been looking forward to all week. I'm really excited about this, I think we've got a great set of people here to kind of talk to and think about some of these issues of how we continue the expansion of the charging infrastructure so that we are at least keeping pace with, if not ahead of the vehicles as they come out.

I wanted to highlight that I really like the point that Leslie made in her presentation about if you build it, they will come, and I think that California has done a really great job with that. I mean, this is the Governor's Office Zero Emission Vehicle Action Plan that really put in piece the places to help spur this market, and then to support it. And the Energy Commission is so excited to have a role in that.

And one of the things that we can do at the Commission is be nimble and be flexible based on the different types of information that we're getting with our solicitations, that sort of say, "Hey, you know what? We really need to point some funding here." Or, "We really need to point some funding there." And we have the ability to do that.

The NREL Report that you heard earlier really talked a lot about how much infrastructure is needed to support the one million vehicles by 2020, and generally where it will go with the different areas that they see it in the state.

And then we've just had our terrific presentations from J.R. DeShazo and Damian Breen that highlights the regional work that's going on, that shows you kind of exactly in those regions where that infrastructure ought to go.

So when you put those two pieces together, we've got a lot of really great information, and then you add in the private investments, as well. And then as I mentioned, again, the role that the Energy Commission can play, then, if there's gaps that need to be filled, we can tailor solicitations to help fill those gaps, and then it all kind of keeps looping back in on itself. I think everybody has got documents that are living and breathing and data as we continue to learn more and as these vehicles continue to roll out.

So it takes a village kind of to expand this changing infrastructure around the state, and I appreciate the partnerships from everybody around the table and others that are helping to make it happen. And so I kind of wanted to frame our conversation because what we'll be talking about is how *do* we get to those next steps and what some of your best thoughts on that are.

I'd love to welcome Randall Winston from the Governor's Office, who is probably a man who needs no introduction, but he is overseeing the Governor's Zero Emission Vehicle Action Plan, along with lots of other things related to Zero Emission Vehicles. I'm delighted to co-facilitate the panel with him. And then I'd like to let you know who is on the phone. We have three folks on the WebEx, Ashley Horvat, who is the Chief Electric Vehicle Officer for the State of Oregon is on the WebEx and will join our discussion; Tony Usibelli who is the Director of Washington State's Energy Office is on the WebEx and will join our discussion; and David Peterson who is the Electric Vehicle Regional Manager for Nissan North America. So I thought what we might do is start over here with Richard and each of you could introduce yourselves, and then I'll let Randall ask the first question to kick us off.

MR. LOWENTHAL: I'm Richard Lowenthal, the Founder and Chief Technical Officer at ChargePoint.

MS. KEHOE: And good morning. Chris Kehoe, Executive Director of the California Plug-In Electric Vehicle Collaborative.

MR. BRIASCO: Hi, good morning. I'm Scott Briasco with the Los Angeles Department of

Water and Power, and I'm a Program Manager of Electric Transportation.

MR. O'DAY: I'm Terry O'Day and I'm with NRG Energy.

DR. MELAINA: Marc Melaina from National Renewable Energy Lab. I'm the Team Lead for Infrastructure Analysis in the Transportation Center.

MR. SCHORSKE: Richard Schorske, Executive Director of EV Communities Alliance.

MR. TURRENTINE: Tom Turrentine, Director of the Plug-In Hybrid and Electric Vehicle Research Center at UC Davis.

COMMISSIONER SCOTT: Welcome, Panelists.

MR. WINSTON: Oh, there we are, I guess it is to me, again, this is Randall Winston from the Governor's Office. Thank you again, Commissioner Scott and Commissioner Douglas, as well. So it looks like I get the first question. I think probably Wade in his opening remarks earlier today mentioned that the Governor's Office will be bringing together a lot of the good work that our agencies have underway to develop and Addendum to the ZEV Action Plan. The Addendum will include an area that has a new set of actions related to EV Infrastructure. What do you think should be the most important, or is the most important new action that needs to be included in that plan?

MR. LOWENTHAL: So I'd like to take a stab.

MS. RAITT: Could I interrupt?

MR. LOWENTHAL: Is this just a shout out?

MS. RAITT: Yeah, I'm sorry, this is Heather Raitt. I wanted to interrupt and say, for our WebEx participants, say your name before you speak into the microphone that would be really helpful. Thank you.

MR. LOWENTHAL: So this is Richard Lowenthal with ChargePoint. I think, Randall, what I've noticed in this conversation and in the analysis that was presented earlier is that we're confusing two issues, and I think we need to settle on them. One, is it the intent of the CEC to try to encourage growth of the car market, or is it the intent to satisfy the cars that are out there by having an adequate infrastructure? In my view, the focus should be on growing the market. So to that end, you would emphasize things like the CEC should give away free signs to show where EVSE is in the public and workplace, and fund their installations, which would probably make more difference than buying a bunch of EVSE -- not in my best interest, but still, if the goal is to grow the industry. Secondly, I think the triangle would have a completely different shape if the idea is to grow sales of EVs, the availability of visible public infrastructure, DC Chargers, all of that, have a way bigger emphasis than the little tiny sliver of the triangle that we give it today. So we have to decide if what this is about, the engineering aspect of getting enough charger in the cars, or if it's about getting enough cars sold.

What we know at ChargePoint from the workplace market is that every time you put a new EVSE in the workplace, a new car gets sold. So we know there's a direct connection. If you want to sell cars, put them in the workplace. I can guarantee you that those sell cars. I can't guarantee you that us getting better about permits in the home charging environment is going to make the difference, even though it's the big fat part of the triangle. So I think the first thing is what’s our goal, is our goal to satisfy the existing market? Or grow it? And I would suggest it’s to grow it, and yet most of the analysis we’re doing today is on satisfying it.

MR. WINSTON: Thank you.

COMMISSIONER SCOTT: Thoughts from other panelists on that?

MR. SCHORSKE: Richard Schorske with EV Communities Alliance. I’ll just piggyback on that. Directionally, I agree with Richard on growing the vehicle market as a priority. I think there’s a lot of opportunity in ride and drives in the Bay Area, the Metropolitan Transportation Commission recently invested in about a million dollars in what we’re calling the Experience Electric Campaign, with the tagline: The Better Ride. And I spend about a day a week on that campaign and recently we had a 600 test drive event in one afternoon, and at another event in the evening had probably 100 test drives, and I personally saw cars being sold, boom, boom, boom, boom, among people who were just relatively casual employees who wandered by and thought, “Gee, this is cool,” there’s 15 plus EV models, most of which they’d never seen or been in before, and the old adage butts in seats really does work, and we haven't had state investment in that, we've had a lot of OEM support, in-kind support from virtually all the manufacturers, but logistic support and so forth is quite costly, there's insurance, there's a variety of things, and we would love to see statewide expansion of that program, it could meaningfully tip the needle on vehicle sales, that's just one idea.

And pursuant to that, we have a number of folks, notably NRG and some other companies, as well, that are doing a build it and hope they will come strategy on make readies and all the way through to EVSE, both in workplace and MUD environments, and there is tremendous opportunity for cross-promotion of the vehicles and concentrated promotion, targeted promotion of the vehicles, especially in larger properties, whether they're workplace or multi-unit residential. So strongly encourage follow-on to –- and we've done a study of our MUD environment in the Bay Area to assess how many buildings and where we would actually go with a co-promotion of following EVSE installations, so we're very excited to actually put that into place, hopefully with some public resources, as well as private resources. So thank you.

MR. TURRENTINE: I’m going to pile it on with the workplace here. I think we’re still in that period of experimentation, I mean, that’s definitely -- we’re not out of that yet, to partially answer Wade’s question, but we’re seeing results with workplace. And things are happening. And I think workplace is also an example of an institutional location and that provides a context for the growth of the market, and that’s why charging with associated programs that go with that, and that set of partners, the business community in California is a way to grow the market and we need to keep, as we’re experimenting, I think we’re still experimenting, we only really have a few businesses out there that have done this so far, but the results look really good and it’s a great partnership in so many ways. You know, we’ve just looked at how big the California market is, how many of those people who are buying new cars drive to workplace, or see other cars at the workplace, it’s a win-win-win, something like that.

MS. KEHOE: I think I just want to add a couple of things. Growing the market absolutely has to be our top priority. I won't explain the California Plug-In Electric Vehicle Collaborative to this crowd because a good section of the audience is already members, and the panelists, but our members are very excited about crossing the 100,000 PEV milestone here in California hopefully in the next few months, it's a real high watermark, but it also serves to highlight that we have a whole long way to go before we get to a million and a half vehicles, which is our goal, and it's the right goal.

But our members have for the last couple years had very important priorities around multi-unit dwelling charging and workplace charging. We have an ongoing infrastructure group that right now, after developing new documents in 2013, are going to be pushing those documents out statewide, and continuing to communicate with Californians across the state, local governments, regional councils, and others, apartment associations, realtors, and other large organizations, in educating them about workplace charging and multi-unit dwelling charging.

Forty to 50 percent or more Californians live in multi-unit dwellings, depending on the community, and after residential charging, workplace charging is the next easiest most convenient opportunity. So we’ve got to keep it simple, I think, and not so much search for the next new thing, unless of course some brilliant idea falls on all of us and we should take advantage of it. Sometimes I think that the Ride and Drives are seen as sort of a low tech solution, but I think they get results too, and I don’t think we can forget about getting people in the cars and having them experience it. We were at UC Davis yesterday and there were car dealers there and car salesmen, and they emphasized how driving the cars is so critical. The average consumer doesn’t have a lot of familiarity, so I think we should keep it simple, keep communicating, and keep educating a broader swath of the general public about how terrific the vehicles are, and keep growing the market. That’s the main goal.

MR. O’DAY: Sure. I think -- oh, go ahead.

MR. PETERSON: This is David Peterson

from Nissan. So to answer the question is actually easy, the Government's ZEV Action Plan is a very comprehensive document, so I don't think there's anything I would necessarily recommend adding. But I just would want to reinforce that workplace and public charging are critical, and we definitely have seen a significant number of sales come out of our direct efforts and others efforts at the workplace. We have a team of folks, business development managers that target workplaces and work with them to develop workplace charging. And we've seen a significant number of sales come from those efforts. But in addition to workplace, public charging and especially DC Fast Charge in the public, we think is important, and that should also be an ongoing focus.

MR. O'DAY: Thanks. This is Terry O'Day with NRG. And I would agree with David that it is quite a comprehensive document, the ZEV Action Plan. And I don't know how much I would add. What I think we do need to think about, though, as still a new document, is how do we implement it, right? How do we track it? Who is responsible for it? How do we engage with each other to make sure that we're achieving those goals, taking those actions, not all of them come from single entity, not all of them come from a single sector, so how do we challenge each other to stay on pace with some of the actions that are in there and so important, as the leadership model is very diverse for responsibility in there.

And I would also add that, as Wade Crowfoot mentioned, we're doing pretty well overall as an industry and we should be proud of that. Cars are selling. I think if I were to look at what are the reasons cars are selling, in addition to having a great range of models and products, we have some important incentives, the $7,500 tax credit federally, the ZEV Mandate and credits which automakers are taking quite seriously now, the CVRP, and HOV Lane access, as well as some other incentives like the San Joaquin Valley Air Pollution Control District, which puts another $3,000 on top of every car sold, and we hope to take more advantage of that this year. And some employers who offer incentives, NRG for example gives $2,000 rebate on top of all of those to every NRG employee that buys a car. So those, I think, are contributing to the success we’re seeing in the market and, as we think about the success, I think those are the most important kinds of incentives, which is sort of Richard’s point, is how do we expand the market –- sell cars. And here I find myself musing on the notion that we’re still asking the chicken and egg question after we’re on our way to 100,000 cars on the road in California, and this question still plagues us. But with this success, we’re kind of I think at the point where we so far answered the question for ourselves, right? The cars are selling, those are the chickens, the chickens are running all over the roads, I guess. And this Assessment that we just heard Marc present, I think, says that also because the entire analysis is based on how many cars we’re going to sell, what are our goals, and how much infrastructure do we need to follow the cars, right? And so the question, I think, is how do we continue to have the success we’re having in sales, which I would say is keep the incentives on the cars, and 2) what are the risks that we’re going to plateau in this ramp-up of sales so that we don’t meet our goals? What’s going to keep us from staying on this trend line that we’re on? And in my view, I take a somewhat contrary position to the interests who described workplace charging as the key priority; I think that, as this Assessment indicates, most people want to charge at home first, that’s the most convenient place to charge and the place where you’re there most often, presumably seven days a week, maybe not for all of us who travel to Sacramento for meetings, but it is the most valuable place for a driver to plug in. And while we’re having success certainly installing in workplace, and there are reasons why workplaces are installing chargers, they may need less funding today than in MDU and other categories, and in specific categories of MDU, in particular. I think what we’re seeing is folks who are not showing up to buy cars, who are not even intenders, who are in MDU because they don’t have a charging solution and they don’t know how to get it. And workplace solves that problem for many of them, but if we can solve it at their home, we can provide a more valuable solution for that driver, and a bigger market incentive as a result.

So, you know, for what we are seeing in the marketplace, we have many condo owners coming to us, for example, and we have worked through dozens of condos trying to solve their problem and cannot. And I think there's a lot to still address in condos and apartments to help open up this market and make sure we don't plateau in our sales. So that's where I think we would put our priority as we look forward on this plan.

COMMISSIONER SCOTT: Great. Let me -- two things, one is there will be a transcript from this conversation, so we'll have a great chance to kind of see the notes and the different questions that were raised, and so I just wanted to make sure folks knew that. I want to turn to our folks on the phone who are participating by WebEx, Ashley and Tony, to see if they have anything to add. But also, I would ask if the three of you, when you're not speaking, if you'll put your phones on mute, that would be terrific because the background noise comes through pretty clearly over the WebEx. But Ashley or Tony, do you have anything to add to Randall's question?

MS. HORVAT: Hi, this is Ashley Horvat with the Oregon Department of Transportation, representing the State of Oregon. Sorry, I'm joining just a little bit later. I'm actually the Chief EV Officer for the State, so my main goal every day is how do we get more EVs on the road in Oregon, but it seems like more and more are parlaying to other states. I'm actually in Boston today, we're having a Georgetown Transportation Climate Initiative Workshop kind of talking through these issues with some of the other states, not just the ZEV space. But, I mean, as far as I don't really know what was said in the beginning, hopefully this is not too duplicative, but one of the things that I think Terry mentioned was the ZEV Action Plan sort of asking the question about, that's great, I think David mentioned how comprehensive it was and, yes, that is very true. Our Governor was sort of hoping we could get everything done in there. But I think as far as implementation goes, we've already started a process of we have a document between the eight states where we've identified sort of the next steps on implementation with the task force and who are the entities which many of you that are on the line would be those entities that we contact as far as implementing some of the actions we're doing, or some of the actual items within each action, because although there's 11 actions, within each there's quite a few underneath that. So implementation is definitely high on our list of priorities. We didn't want to just put out the plan and sort of call it a day. And as far as Terry's comment about what else needs to be done other than just replace charging, which is a really popular suggestion, I think there's a lot of states that are actually putting quite a bit of money out there, and a lot of incentives, and a resounding theme that I'm hearing is as far as the numbers of people actually utilizing those incentives, be it monetary or nonmonetary are actually pretty low. In California, they're not having that problem, but I think one of the things I would focus on is communicating everything that is out there as far as incentives for EV, from the benefits of EV through different mediums, you know, not just relying on the automakers to disseminate the information to the dealers, but also working with the utilities to get -- like we have a utility that just sent out something to about 40 there and people in their jurisdiction on EVs, and so using the utilities as a communication for what we already have available, maybe sports, you know, EDTA, Formula E, working with the sports teams to communicate that message, music, and then on the workplace charging front, maybe not just thinking about trying to get the employers to solve the infrastructure, but trying to get them to disseminate information on programs and incentives that are available so people are actually aware that EVs are relatively affordable. And they just don't have clean air, but if it's that they also have benefits that they can reap, parking or HOV lanes. So that's all that I would add at this point.

COMMISSIONER SCOTT: Thank you. And thank you so much for joining us all the way from Boston, we really do appreciate it. Let's turn to Scott.

MR. BRIASCO: Sure. So this is Scott Briasco with Los Angeles Department of Water and Power. And you know, we have the benefit of being both a utility and a government agency, and we've been fairly active in supporting infrastructure deployment throughout the city.

We have a rebate program. You know our initial rebate program was $2,000 for residential customers towards the cost of the charger and the installation, and that was fairly successful. That program has been revised and expanded, we now provide rebates for commercial customers, so that’s workplace and public charging, and the dollar amount has been reduced to sort of spread the money out.

We also coordinate pretty closely with a lot of the other City Departments, so putting charging at City properties that are accessible to the public, so it’s LAX, it’s the Los Angeles Department of Transportation, parking facilities, we’ve installed over 200 public charging stations that are available, and folks can use those, there’s no cost to access those chargers. We are installing a network of DC Fast Chargers, so it’ll be 16 units, we’ve already installed the first six of those.

You know, I’d like to emphasize the benefits of workplace charging. I mean, we’re seeing it certainly at our main office building where we have 40, and we’re going to expand that to 60, and people buy vehicles that have access to those chargers. I mean, we're seeing it, it's real, I go down and I see folks that pull in and use those units in our public parking lot at the Department of Water and Power where we have a DC Fast Charger, but also employees. And you talk to them and they will tell you, the reason I bought my vehicle, or at least my vehicle(s), is because I have access to the charging here. And it goes to the MUD folks, too. There's a co-worker and he has a volt, he travels 22 miles one way and he doesn't have charging at home in his condo, but he has access to the charger at work, so that was his main reason for getting the vehicle.

Another thing is I think it's important for the utilities obviously to be very active in this space. We don't have some of the restrictions I think that some of the investor-owned utilities have in the state, so if they could become more active, I think it would do a lot to help facilitate this market. So it's customer education, awareness, and doing other things to sort of promote the installation of these charging stations; I think it's important.

COMMISSIONER SCOTT: Great.

MR. BRIASCO: One other point. The solicitations from the Energy Commission and other agencies that provide cost share funding I think is really important. It helps pull together these teams that would otherwise not be brought together to really be active in the infrastructure marketplace. You know, there are obviously rebates for vehicles, if there were a rebate process for workplace charging, I think that might be very useful. The process to prepare a grant application and submit it to the Energy Commission is pretty involved and, you know, the manager of a workplace that is only going to install a handful of chargers probably wouldn't go through that process, but if there were a rebate available, they might step up and do that. So just a suggestion.

COMMISSIONER DOUGLAS: So I just have a quick question. I'm trying to parse through the information that you're providing, all of the panelists are providing on workplace versus home charging, and I can certainly see the logic of workplace charging helping incentivize people to take the step and buy the vehicle, but I wonder if those are people who in general also know that they can charge a home and are just happy that they can also charge at work, or if we really are seeing significant numbers of people that don't have access to home charging buying because they can charge at work. If anyone has any insight on that, that would be helpful.

MR. LOWENTHAL: So workplace charging is the majority of charge place business. What we see is more of an awareness issue than it's the workplace charging exactly. I mean, in the case of this poor fellow stuck in multi-family housing, okay, then it's essential. But we see more often it's the exposure, it's seeing the other cars there, it's seeing that their workplace is engaged with it, that they'll have a place to charge at work.

One of the Phase 2 problems we have, and I guess it needs to go in our updated plans, we talked about a Phase 2 here earlier, is that we got started and now we have a lot of congestion in places. And so we have some horribly unused charging stations around, probably half of them don't get any use, or very little use, and then we have 10 percent that are red hot, always used. The good thing about workplace is you know there’s going to be enough, you know where you’re going to park, it’s there every day, they see it every day. If our employees drive from -- we’re in Silicon Valley -- if they drive from Silicon Valley to San Francisco, they tend to not take their short range BEVs because they can’t be sure there will be an EVSE available in the public spaces there. So their alternative is to charge up at work and do the things they can do in round trips, so they use it to get a little more range. We still have a fair amount of range anxiety for the cars that are in the sub one hundred mile range, and so the workplace in some ways doubles that range. They reclaim their drive from home even if they are home charging, and then they have a more useful car during the day. So those are the factors we’re seeing. I would say the number one aspect, though, is the exposure and awareness, they’re seeing other cars and people love their cars, they talk to their fellow employees.

MR. BRIASCO: So, you know, my personal experience, I drive a *Volt* and I’ve had it for about 14 months and have about 16,000 miles on the vehicle. My one-way commute to work is 35 miles and I've burned a total of 24 gallons of gasoline since I've had that vehicle, and the only way I'm able to do that obviously is to charge at home, which I do, I have a little two-charger at home, and when I get to work I charge, and that's enough to get me home. I think a lot of people are in that similar situation. You now, obviously I like Electric Vehicles, I've been involved with them for a long time, and I would step up and get the vehicle regardless, but I think others that are in a similar situation, you know if that workplace charging isn't there, they're not going to make that decision to do that. And certainly they wouldn't have the same amount of electric miles, I mean, they could obviously get a Volt and half their miles would be gas and half would be electric, but it really does extend the electric miles driven on a vehicle of that type.

MR. WINSTON: If I may. So I wanted to go back to one of Wade's earlier questions, actually, and I'll try to tie in another specific question as well. With regard to when the government should step back, what is the appropriate level of investment in public infrastructure, and are there aspects or barriers related to the EVSE business model, business models plural, that we should be aware of?

MR. O’DAY: And this is Terry O’Day from NRG. That segues right into what I was going to answer for Commissioner Douglas’s question, as well. I don’t think, Commissioner Douglas, there is data available today on how many folks are using chargers at their workplace or their primary chargers, and how many of them don’t have access to a home charger. And that might be a useful place to have some more investigation. And I think that looking at this question of workplace versus public versus home or MDU, I get right to that question that Mr. Winston is asking, which is today workplaces are willing to invest more than we find in multi-family housing, and there are more significant barriers in multi-family housing to make the investment happen, even when the money is on the table. So I think that’s the area from a policy point of view that needs the most help. We’re getting the most traction in workplace partly because they are more willing to pay, and that’s important and helpful, and it does all those things that I think others are saying, where there’s exposure and seeing other cars also helps make more sales happen, and that also happens in MDU, though. You see your neighbors in the parking lot and the access to charging that will inspire more cars to be sold, we just don’t have as much experience because the barriers are more significant in MDU. And of course there are equity issues when we’re talking about renters versus homeowners, we’re going directly at equity issues that are important to us from a policy point of view. But in the workplace, there are still barriers, too, in particular the disconnect between ownership and tenancy which is the problem in MDU, it’s also a problem in workplace. The very parochial example of NRG’s offices in Carlsbad, we’re renters there and, you know, we have a heck of a time trying to get our landlord to agree to install chargers. And when we did, you know, they made us pay the reserved parking price which is an extra 100 percent of the parking rate that we’re paying on a per individual basis. So those kinds of problems are real for workplace, as well as being under-parked, and electrical capacity issues and those things are meaningful and need to be addressed too.

COMMISSIONER SCOTT: Let me see if any of our folks on the WebEx want to address that question.

MR. USIBELLI: This is Tony Usibelli from the State of Washington. Can you hear me?

COMMISSIONER SCOTT: Yes, we can.

MR. USIBELLI: Okay, and of course my other phone starts ringing right when I come on the line. The question about the role of government is one that we’re spending a lot of time thinking about in the State of Washington. Our development and our early deployment of the charging infrastructure really was funded by money from the Federal Government. And to date, related to our overall transportation funding, it’s been difficult for us to find any additional state funding to help deploy that network more widely. We’re continuing to try that. But I think we’re in a situation in Washington where we’re really trying to determine where does the state have a role with respect to infrastructure such that we make the value proposition for the consumer better, and that’s what most people here have been talking about, more comfort with issues of range anxiety, an ability that you feel that the systems are available there so you can use this at work or in other directions where you want to move around. So what we've got underway right now is the Legislature last year did fund a study, we got the Center for Climate and Energy Solutions doing a study on what are the business models that are available out there for encouraging the deployment of infrastructure. And I think that's going to be a pretty important piece for us in Washington to have a report by the end of the year and a final the early part of next year in really helping us determine where we think the state can effectively intervene to build out some of this infrastructure that might not otherwise represent a value proposition for the private sector, for the utilities, or for others who see this as a business proposition.

COMMISSIONER SCOTT: Anyone else from the WebEx? Okay, and in the room we had Richard S. and then Chris Kehoe, and then Marc Melaina.

MR. SCHORSKE: I just want to make a couple of suggestions on the workplace and the MUD front in terms of state investment. I strongly agree with Terry on the issue of the relative obstacles, that has certainly been our experience. And what I noticed in the recent solicitation from the CEC was that we are spending roughly in several of the solicitations that I was involved in 10Kish per charger for the workplace and public access chargers. If we spend 5K in MUDs on a routine basis, we might get the same level of impact in terms of charges per day and vehicles served, or better. So for example, we had one project we called San Francisco City Charge where we have a co-location of MUD in commercial districts, such that, as in many cities, there’s lots of apartments downtown, a very common scenario, and many of those residents of course are commuting. So you have those garages available during the day. With appropriate incentives, property owners are willing in many cases, a surprising number of cases actually, and by “appropriate incentives” I mean what they usually get for a parking space in a city, which is a substantial amount of either monthly revenue or hourly revenue, however it’s built out. But in those cases you could easily get a couple of the MUD resident vehicles charged at night, a combination of Level 2 and Level 1 is very cost efficient there and practical. And you can get potentially one or two charges per day, vehicles per day charged as well. It’s a very unique high benefit, high ROI scenario, and to have a coupon that goes to a buyer who is an MUD resident that would be additive of the vehicle’s CVRP coupon, that might be as much as five grand, to cash in with their landlord in a high unit building would be great. It would make the difference in a lot of cases for a company that has a revenue model that is close, but not quite. And so I would look very carefully at that because I think you’d get a lot of bang for the buck on that kind of an approach.

And then relative to that, I just want to add one other idea, and this is both for MUD and workplace, and that is we have now so many instances where we’ve got single-digit, a small number, maybe 10 or 12 chargers at a workplace or a public lot, and all of a sudden you’ve got a massive electrical upgrade scenario and/or a massive demand charge scenario. And we’re talking, you know, 50K plus in dollars or more to address those scenarios to get to the next 10, 20, 30 or 50 chargers. And if you average the cost there, you've got 10 grand per charger to the first 10, and then the next 10 might be 20 grand per charger, and if you amortize that, so we need a special fund for this scenario, especially Richard Lowenthal gave a great example, it's absolutely the case in San Francisco, you cannot count on finding a public Level 2 charger anywhere in the downtown area for sure. So driving in from Sacramento or San Jose on a *Leaf*, forget about it. It's too dangerous for you as a driver. And Leslie is nodding her head, Leslie Baroody, because she has this problem, we all have this problem, we have a short range BEV. So we need to break through that wall, it's a Capex wall, capital expense wall, and we need to be able to have some kind of a special grant program where if you've got the Third and Mission Street Garage in San Francisco, or if you've got a 200-unit MUD, you can apply for a $50,000 or $100,000 one-time upgrade that gets you from 10 chargers to 50, or from 20 to 100, that's super important and I don't know how we're getting there from here without some special injection of cash, including significant public resource to do it. So, thanks.

COMMISSIONER SCOTT: Chris.

MR. PETERSON: This is David Peterson from -- hello?

COMMISSIONER SCOTT: Hi, David. Go ahead.

MR. PETERSON: Hi. Thanks. All right, I didn’t realize I had to unmute on the WebEx itself. Just a couple of thoughts. I agree with everyone’s comments about focusing on multi-unit dwellings, I think that is critical, and I think Terry O’Day’s comments from NRG are very relevant, and I think perhaps a targeted focus on MUDs along the lines of what J.R. DeShazo from UCLA Luskin Center proposed might be something worth considering in the future.

I also would be cautious about over-emphasizing workplace charging. I think we’ve seen a lot of the workplaces in California make investments, but I question how long that will continue, so I think ideas about how to compute that in the short run are welcome. But then I would emphasize public DC Fast Charging and I’d like to share some data that we did from a survey from February of this year. And what we found was that most of our drivers do charge at home and, mind you, this is a national survey, it's not California-specific, but what we found is most drivers do charge at home, and that two-thirds of our drivers charge in public regularly and 25 percent of all of our drivers charge at least once a week. Now Fast Charging to us, and this is something that we've actually learned over the past three to four years, Fast Charging to us wasn't obvious to us that it was always going to be the preferred level of charging, but what we found through our survey was the time it takes to charge is the number one consideration when seeking out a charger. And so public DC Fast in places that are convenient, that enable people to get a fast charge when they want it, is going to be critical not just to adoption, but to enabling more travel for existing drivers. So I think the example that's come up is the San Francisco to San Jose corridor, right? So driving along 101 or 280 in either direction, you might not take your BEV, or short range BEV as it has been called, so you might not take your *Leaf*, but you might take another car. What we want is to make sure that situation is avoided and that you can take your *Leaf* and that you can travel throughout the San Francisco Bay Area without having to worry about where you’re going to get your next charge. And so that brings me to my point about where some assistance might be needed, and that’s that marginal cost of installing DC Fast Charging infrastructure. I think once we’ve identified all the low cost easy installations, of which there weren’t many, we’re left with a lot of high cost difficult installations. And a lot of that cost is going to be on the utility side of the meter, with really expensive infrastructure upgrades. And that is a strong deterrent to growing more DC Fast Chargers. Now, the CEC, South Coast AQMD, Bay Area AQMD, and other organizations have done a tremendous job of providing a significant amount of incentives to help address the upfront capital costs. But one thing that I’ve learned from my travels throughout the U.S. and in discussions with other utilities is that there’s a business case to be made, an increasingly attractive business case to be made, for DC Fast Charging, and I’ve learned this from natural gas, in the State of Washington where demand for natural gas as transportation fuel has been increasing, and the utility there has been making investments on the customer side of the meter. And this is simply due to the fact that that utility can now have greater certainty about ROI for any investments made in supplying natural gas to transportation fuel. While I think we're starting to get closer and closer to a point in California where utilities -- where we're seeing enough demand at DC Fast Chargers. And we've learned this from deployments throughout the state that we've had at our dealerships and in learnings from our partners, that we're seeing a more stable utilization of DC Fast Charging, more regular utilization of DC Fast Charging, which I think will help make a better business case for all stakeholders, but I think it starts to bring into question, or open up the possibility frankly, for utilities to rethink their role in deploying and helping support DC Fast Charging.

COMMISSIONER SCOTT: Great. We have teed up Christine Kehoe and then Marc Melaina, and then Ashley Horvat on the phone, and then over to Tom Turrentine. So, Chris, you're next.

MS. KEHOE: Thank you, Janea. Randall, I guess to answer your question when should

Government step back, the answer is not yet. Everything we're discussing today is there are a lot of positive bright lights, there's growth in penetration of the PEVs, we're moving beyond the early adopters a little bit, but we still have a long way to go and I think, as you're hearing from everybody at the table, if sales of the cars are still our number one goal, and I think it is, then Government's role in providing consistent incentives and investment on the infrastructure side, I think, is really critical and important. We've still -- the Government's leadership has been terrific, but the market isn't yet, whatever, self-sustaining? Or it still needs, I think, some structure around it that will help consumers have confidence in the vehicles and the charging system, and so I think you need to stay involved.

COMMISSIONER SCOTT: Marc and then Ashley.

MS. KEHOE: Could I just say one thing?

COMMISSIONER SCOTT: Oh, yes, of course.

MS. KEHOE: Well, just because when we get out of these educated conversations where people know what they're talking about, more or less, you know, the questions I hear are so rudimentary. If I talk to a business owner about having an electric car charger at his or her facility, the first question almost always is “is there money for that,” meaning is there public money for that. And when I talk to my friends about PEVs, the questions again are “how far does it go,” and that’s the kind of language they use, and “where do you plug it in and how long does it take?” So we still need to continue to have Ride-and-Drives and other kinds of really engaging, simple, get the people in their cars kind of educational opportunities, along with policy and best practices kinds of conversations.

DR. MELAINA: Marc Melaina. So I think I have the same response for both questions, the previous one and this one, I think it’s really around understanding the consumer better. So in terms of the Addendum, I like the comments about Ride-and-Drive and outreach to consumers, but also trying to understand what they don’t know, what they need better, and not just for early adopters, but the next phase of consumers. So that should be part of the outreach, or integrated with the outreach activities and with engagement with dealers and such.

On pulling back on public support, I think a key part of understanding when the end point is, is understanding the business case on the private side, and that's really closely linked to the consumer also. So to me, I think sales from kilowatt hours is an important part of their business case. But the same as we have with gasoline stations today, these other things that they get as a revenue from public commercial infrastructure, a green image, walk-by traffic, additional sales from other items, it becomes a magnet for them. If the private sector understands consumers better and who is driving these vehicles, who is going to drive them in the future, they're going to be making a more robust business case around that information. And we don't have enough for them to do it yet. So if we want to know when to pull back on public support, we need to know what's going to happen on that side when they know, you know, "we have a rock solid business case for this next five percent of the market because this is what we know about them."

COMMISSIONER SCOTT: Great. Ashley.

MS. HORVAT: Hi. Can you hear me okay?

COMMISSIONER SCOTT: Yes.

MS. HORVAT: Okay. So I just find it an interesting conversation, striking MUDs as taking a front seat to workplace charging because for the past year all I've been hearing about is workplace charging. And I mean, I'm an evangelist for, I think, we don't cancel out one or the other, I think you definitely have to have both. But the MUD focus is interesting to me because I think, you know, kind of taking a step back and looking at what are the normal -- what is the typical new car buyer. And so if we sort of feel like in Oregon and some of the other states we're kind of getting to that point where we've covered the early adopter junk and we need to get over to the early majority, if you focus on MUD, you're really opening it up to get some people to maybe change over one of their cars that they more otherwise were planning on buying a new car. You know, I had a call yesterday from a guy in the Condo Association, there's 300 people that live there, and he's close to getting them to -- wants to get them to approve basically a couple hundred thousand dollar investment to cover enough of the population there to have EVs and they have to get 75 percent of the 300 people that live there to approve it. And so I'm supposed to go speak to them and try to convince them and basically push them over the edge to do that, so that's a private investment and they'd have to increase their HOA fees, and there's a lot of complications there, but I think that we have the propensity to be able to jumpstart adoption in areas that, like I said, probably wouldn't have got a new car, an agreement on needing to kind of refocus a little bit on MUDs.

And then, I guess in terms of the role of government, and to echo David's point, I think DC Fast Charging along corridors has obviously been my focus for the past few years with Electric, you know, harmonizing government and other states can continue to play a role, I would just kind of alert everybody here to something that's going to be coming out pretty soon with DOT, U.S. DOT, there is something in the transportation package about corridor charging, and I'll be doing some workshops over the next few years for DOT to get some other regions connected there with Fast Charging.

And I guess the next thing I would also kind of bring to attention in the Action Plan, one of the resounding things that we heard when we did our outreach, was engaging the PUCs to discover what the utilities' role could be, could it be more proactive, whether it be investment in Fast Charging, mitigation and demand charging, you know, or some other incentive out there? Or people to put in commercial fast charging stations.

And then lastly, I would just say I definitely think there is still a role for government to play, other than what I've mentioned for a number of things, but I think maybe five years down the road we'll get to the point where hopefully the private industry will be mature and some of the rudimentary things like signage and Building Code, I think really have a role for Government to play, but it's a good time right now to be in government if you're willing to so innovative things. But hopefully in five years we would kind of get to I guess what I call the boring stuff, which is just the rudimentary kind of making sure everything works.

COMMISSIONER SCOTT: Thanks, Ashley.

Hey, I might ask if you want to spend 30 seconds, you mention that you have an upcoming conference at the end of July, and just to tell folks 30 seconds about that before we turn to Tom for his thoughts.

MS. HORVAT: Absolutely. Yeah, we have a conference in Portland July 23rd through the 25th called EV Roadmap, so you can Google that and a website will pull up, EVRoadmapConference.com, and I think a few of you actually will be there speaking at the conference, so we're excited about that and it's sort of unique in the sense that, on the 23rd, the U.S. Department of Transportation will be coming in sponsoring the conference and hosting a workshop on DOT involvement and they're really interested in playing a bigger role based on the experience we've had in Oregon. And then the other interesting element there is we're going to be having a fleet conference workshop for the Pacific Coast Collaborative to try to encourage private and public fleets to meet our goal that the three Governors signed on the Climate Pact, which is 10 percent of fleet purchases being ZEVs. So it's a very aggressive goal, we've got a lot of work to do, and we'd love to have you guys there for that. And then finally, of course, the EV Roadmaps Conference is about making connections, we've got quite a few sort of looking five years, 10 years forward, and I think it will be a really interesting conversation. And lastly, Portland in July is kind of the best place to be in the country, so I would definitely recommend coming, we're going to be doing some of the -- I don't know if you all heard about it, but we've create the Oregon Electric Highways, and so we're going to be taking the first -- I think at this point it's 25 people that sign up when we post it, we'll be taking 20 people in *Nissan Leafs* along the Columbia River Gorge, so the different breweries for some tasting, and just to get a chance to explore nature in electric.

COMMISSIONER SCOTT: Like it. Thank you, Ashley. Let's turn to Tom.

MR. TURRENTINE: So we've talked about -- we keep rotating around these important locations for the system and I want to emphasize again that we are definitely still in this period of experimentation. And you know, to comment on

Ashley's, we want to get to that early majority, but I actually think, you know, most of the models in this area on developing these markets, some of them jump immediately from -- we think we go from those sort of innovators, and then we jump right to the early majority; actually there's a big market in there that has to be developed that aren't that majority market, that are the super pragmatic just buy on cost. There's another group of people who kind of watch those first innovators and who are taking the experimentation and plugging in, we're doing all kinds of things to make their car work and as we develop that infrastructure, but we're really actually aiming at the next market segment which is watching those people and it still has considerable resources to make what are going to be relatively expensive and maybe second generation designs of vehicles. But we do have to do experiments. I think with the MUDs, for example, with workplaces we're getting some data back, we're like going, wow, something is happening there, those are partnerships that we can develop, but at the MUDs, this is really experimentation, building by building, right? I mean, you’ve got to solve these problems. So we have to put resources into experimentation, but we don’t know for sure what’s going to happen there. So I think you have to be careful just to put the infrastructure out there, for example, in MUDs. You probably need some sort of test for is this building, who is going to buy, and what’s that. You can’t just put it there, otherwise we could end up, like I’ve joked about Estonia which has a network of 200 Fast Chargers and I think about 100 vehicles. And we don’t want to be there or Ireland which has 30 Fast Chargers, and I think they’ve reported that nobody has used those this year because their market is not there. So we do have to stay focused on the market and not think that, by putting that infrastructure in, we have to be careful, we’ve got to do the experiments, but stay focused.

So I think one of the things with Workplace that’s important, it’s a good point about we run into barriers if we get too many chargers in a workplace, and we’re not managing it, and I think that’s because it’s free, we’ve talked about that, and to answer your questions, Karen, I think we see some of that and there’s some data that's got to be gathered so that we know -- and probably there should be some fair costing of the use of that at some point. I mean, the hard thing there is people want to provide that at work, it's great, we are seeing some of that, but it does need to be measured, to the other point which is back to Marc Melaina's point about adaptive management. So we can't think of this as a plan that we're going to implement, we really -- this is a process which we have to manage over time and our planning has to be adaptive, it has to realize that MUDs and everything, we're going to learn a lot as we do that. And so we don't know the answers now, and a lot of people are working on it, but we're still in that process and we're going to optimize this infrastructure next, as I think in the points that Leslie Baroody was reading in something I recently wrote, we're going to try to optimize this pretty soon, and we're not even close to really coming to understanding that optimal network.

Another point is the role of all these different type of vehicles, we tend to all kind of keep going back to vehicles with 70-80 miles of range, that’s really what public infrastructure -- but we do have a lot of vehicles coming out and there’s some great range and understanding of how many there’s going to be of each of those types of vehicles, and we’re going to have to accommodate a broad range of vehicles with different size batteries, so we have to be very flexible in our understanding of what types of chargers go into workplaces, MUDs, and we need to be watching who is going to buy those cars because the market is actually a broad range of vehicles. And, you know, I’m breaking it into four categories now, and 80-mile vehicles are only one out of four types of designs that are going out there, that we have to accommodate.

COMMISSIONER SCOTT: Let’s go to Richard L. and then I want to ask a question.

MR. LOWENTHAL: Thank you. I wanted to have a chance at Wade’s question, too –- Wade’s, sorry -- Randall’s question. It says Wade in front of you, sorry. So I’m triggering off your nameplate. So it splits in a couple of areas, and I think Marc’s comments were quite important. The Workplace and Retail are nearly self-sufficient and there I would recommend that

Government funding be sort of highly leveraged, that you require financial participation by others. You know, we have bank financing available and I think if the state, rather than giving grants could use its financial powers, use the Treasurer’s Office for sort of risk reduction of loans, or whatever, we’re ready for that in Workplace, in particular, and Retail as well. Both of those, there’s a business model that kind of goes along with it, there’s a draw for charging, and so they just kind of need to finish the job. So there I would say Government partial support would be adequate and I would recommend a high leverage.

The ones that are completely stuck are this Multi-Family Housing and Municipal, which hasn’t been brought up, but the Municipal is quite important. This is why you can’t drive your BEV from San Jose to San Francisco, because they do not pay for anything, the Cities. So we still need help there.

In the case of Multi-Family, what’s different about it is there’s this infrastructure cost that’s not associated with the vehicle, so to get started in a multi-family housing, you start with a $35,000 to $50,000 bill for a panel upgrade, minimum. And that’s the piece, we can’t find anybody that wants to pay for that. The landlords and Homeowners Associations only understand getting rent, so the only understand receiving money, and the models that we are seeing that work the best in Multi-Family is where we pay them rent to be there, which is -- that’s a tough one for us. But in any case, right now we need a different funding vehicle for the panel upgrade, the sort of make ready piece, that isn’t associated with a single tenant because nobody wants to pay for it. And we get this argument where, okay, each tenant then has to pay for one-sixth because maybe we’ll have six cars, but then you have this horrible Homeowners Association discussion that falls flat, doesn’t work, or a landlord, so I would -- if you have to prioritize, Randall, which I think your question was about, I think we could pull back a little bit on workplace funding and use new vehicles for that, and we could pull back on Retail because they have a reason for people to buy a charging station. But Municipal and Multi-Family? It’s not time. Those are going nowhere. And the particular problem with Multi-Family is, to make the costs the same, or hopefully less than if you own your own home. And we've got a $35,000 hole in that equation right now, so it doesn't flow.

MR. WINSTON: Thank you.

COMMISSIONER SCOTT: That's great. That's a terrific lead-in, actually, to what I wanted to ask next. I feel like what we've been hearing is the value of both the Multi-Family dwellings and the value of Workplace charging, in Workplace charging one of the values that it brings is the public information and the education and the fact that people can see, yes, the charging stations are out there. And on the Multi-Family dwelling piece, the really important part there is what we've been hearing about how people prefer to charge at home, right? And Richard, I think you kind of laid out really nicely, I mean, what I wanted to do was ask you all if you have specific suggestions for how we address that, how we get into that realm, and then when I say "we," I should also be specific, I mean, is that a state thing? Is that a private investment thing? Is that -- who do you think would be the right set of folks to take that on?

And you can answer in terms of Multi-Family dwellings, in terms of Workplace charging, or both. But I'm kind of looking for if you have specifics or if there are challenges or barriers. And, Richard, you've just identified one in terms of the cost of upgrading the panel, and Ashley identified one, as well, in terms of the fellow who is working in his Condo Association to get the 75 percent of the people to upgrade the panel. But if you guys have other thoughts and ideas about how we can kind of get from where we are as identifying this as a challenge to the next step, I'd love to hear those. So I'll start with Richard S.

MR. SCHORSKE: Yeah, if I might. This is actually something that gets at your question indirectly, and that is the issue of the downtown dilemma vis a vis the certainty of charging, particularly at higher rates of charge and particularly, I think David it was on the phone who made a point or somebody did, about the Fast Charge situation, and I think it's extremely distressing that we don't have right now any answer, any equivalent to the *Tesla* Super Chargers for anybody else. And indeed, we don't even have a plan for an answer. The *Nissan* program which is fantastic, which I wish all OEMs had something similar, is not proposing to do banks of 10 chargers, to my knowledge, and it’s mostly focused on corridors, which is understandable, travel corridors and inner city travel. I think it’s really important and I would love to see a specific pot of money from the CEC have something like a Tesla Super Charger array, and I’m talking 10, 15 chargers, I know that sounds like a lot, but it’s not when you consider the dwell time of half an hour to 45 minutes, it’s really the equivalent of maybe a four bank of gasoline pumps, if that. But to have something like 10, 15, 20 chargers in key downtown locations throughout the state. So that might be a dozen super super charger equivalent depots which are valet attended, and so that you can have the optimum throughput and maybe they would be co-located with some Level 2s are whatever for folks that can use that rate of charge and also benefit from the valet approach. But I don’t see how we’re going to solve for the driving your *Leaf* to San Francisco, or driving your *Leaf* to downtown location X in a congested environment without a reliable place to go, a few ideally, where you absolutely know for sure you're going to get a charge within a reasonable period of time, in two hours or less. So I just want to throw that out as one specific idea, and I don't know, the economics of that are incredibly challenging and I have no idea what would be required by way of subsidy, but to put out a very substantial, you know, an attractive RFP and see what you get would be very very interesting.

And I'm going to add one other item and this has to do with the proportionality of the AB 118 plan of Electric Drive, specifically EV versus other alt fuels, and I don't want to spend a lot of time on it because I know this isn't necessarily the place, but we've got roughly low $30 million range cumulative in EVSE over the life of the program to date, and it's somewhere around $100 million for combination natural gas and H2. Considering the GHG factors on those, that's a very problematic ratio. We don't know for sure what the methane leakage is in natural gas, we could be making a very bad investment environmentally on that, and the jury is out on that and ARB and others are aware of that, so the jury is out on natural gas, and there are some very rosy assumptions behind a lot of the hydrogen numbers associated with clean energy reformation versus natural gas, and so on, many many rosy assumptions, and it's very questionable as to whether there's a significant GHG advantage. Criteria pollutants is another matter, but GHG, very very problematic. So if we had another $70 million per three years to invest in Electric Drive, think of it, we'd solve that super charger problem right away, we'd have much more, we wouldn't be robbing Peter to pay Paul, and incentives, we wouldn't be having debates about Workplace versus MUD, we could really do it all. So I would just invite the Commission to look very critically at the proportionality given the numbers of vehicles, the speed of the technology and market adoption, and the GHG impact per dollar. Thank you.

COMMISSIONER SCOTT: Other thoughts from the panel on my question? Go ahead, Chris.

MS. KEHOE: If I can just quickly -- this has been such a good discussion and I'm glad that our members have for the last couple years focused as a priority on Workplace charging and MUDs. And we have significant case studies on Workplace charging and a few on MUDs, in fact, Joel Pointon who is heading up our MUD efforts this year, along with Lisa Chiladakis who is on staff, and so we are going to be gathering additional case studies on MUD charging as we roll out this outreach project this year, and that's information that will be available to all of you as all our information is on our website, PEVCollaborative.org. And so we'll keep you posted. But I think that, you know, as we've heard over and over again this morning, there are a huge swath of Californians that live in Multi-Unit dwellings of some type, and it is a building-by-building exercise, as Tom said, kind of gorilla charging or something, that we really need to dig in there and see what kind of alternatives we can come up with. That's a part of the work that we'll be doing.

COMMISSIONER SCOTT: I see Terry and then Marc, then Richard L., and then we'll go to the folks on the phone and see if they have anything to add. So, Terry, please.

MR. O'DAY: I think I understand your

question as what, who, how. And I think I would agree with how Richard described what, which is to begin to walk away from public and from workplace and focus more on the Multi-Family, the barriers in the “what” being the transformer upgrades, for us as we go out and install Fast Charging now with our Freedom Stations; in public places, we are looking for transformers that have capacity because the barrier of installing a new transformer is very significant. And two factors for us, as you know we’re under a time crunch to get our chargers installed, and so that’s a six-month project often with the utility, and 2) it’s about a $25,000, $30,000 new transformer, and there’s different rules among the utilities about who pays for it and how much, and those are simply complicated for anyone involved in the industry, but also expensive if you end up carrying the burden with cost. And demand charge is out there as a significant “what.” Some of those same factors are barriers in MDU and Workplace, but just at a different scale.

And the “who,” we’ve been quite successful, I think, and the involvement of the various agencies to date and their funding programs, there was a suggestion that utilities invest more and I think that there are proposals out there, particularly on funding, what we've called Make Readies and it's that infrastructure to get over the barrier of the transformer conduit to parking spaces, I think that's something that could be a meaningful stimulus.

As for the "how," I think one of the things that have made us successful is the consistency of our funding and approaches. And that's the rebate program that thankfully we've managed to keep this year, as well as the regulatory structure of the ZEV Mandate, etc. As we think about new funding models, i.e., utility involvement, there's a danger in the "how" factor. We had a major prospect for us in MDU turn us down this week because they heard rumors that utilities would be fully funding. And in other states we've seen the first inklings of rebate programs also squash sales of cars for months at a time because, for example, Texas just instituted their rebate program and for the last six months haven't sold very many cars because people have been waiting for that rebate program to kick in. So we have to be careful about the "how" as we transition from our current funding strategies to new ones. And I think this would be my last moment to speak, so I'll just add for Leslie that, when you drive to San Francisco, we have two Freedom Stations in the City for you now. You can feel confident. And one in Vacaville, just in case.

COMMISSIONER SCOTT: Excellent. So then we have Marc, and Richard L., and then we'll check on the phone.

DR. MELAINA: So I think this item might already be captured somewhere, but I just want to reemphasize for MUDs, I think the goal of the initiative is important, what is trying to be accomplished, and it also has to do if we look at these different buildings, different consumer types, we have to think about the used car market that is going to grow very quickly, it's going to grow as quickly as the new car market, just later, and it's going to be a different type of consumer. The early adopters are really critical, but as we move to this next group that Tom is talking about, those people are going to be a little bit more cautious and they want to know about the resale value of their car, so that's going to be more a part of their equation than the early adopters, I would say. So if there are different goals for MUDs, part of it should be thinking about lower income families having a solid fuel savings equation for these after-market vehicles, which are going to be growing as quickly.

COMMISSIONER SCOTT: Richard.

MR. LOWENTHAL: So one thing I wanted to say is I think this recent PON, PON-606, was well done and very effective, I would recommend more of that, absolutely Cities and Counties especially need your help, I think it was a well-architected PON and you could run that again, there was plenty of demand. So that might be the easiest thing you could do because you could rinse and repeat.

You know, I'm going to bring up something I'm sure is controversial and maybe not in the jurisdiction of this Commission, but in Hawaii there is no demand charges on DC charging, and DC charging can make money and sustain itself without that; otherwise we start in a hole of $50.00 a day that we have to pay to the utility before anybody pulls in and charges their car.

The economics of DC charging will be fine. And in the long term, that is how we will wean ourselves off of government funding here because the value is very high compared to the cost, except for the demand charge. This $50.00 a day is a killer. So if there is a way to mimic Hawaii on that, it would be great. Hawaii toyed with a few ways of doing this, originally they talked about doing a load management, requiring a load management, and I think ultimately they didn't, but that's good middle ground and maybe we can add some battery storage to these things to get through load management. But that's going to hurt the self-sustainability of that business, it is there otherwise, by the way. If we could just put in the DC charger and pay for the real estate and operation, then the drivers are willing to fund the rest. So we're close.

And in general, I commented earlier on leverage. On a few of these things, we're close. On DC charging, we're close, on retail we're close, on workplace we're close, so more highly leveraged participation by the government whether it's sort of bank participation, you know, capital participation or grants will work in all except for the Municipal and Multi-Family. In Multi-Family, you're just going to have to pay for those panel upgrades, there's just no way we're going to get there without it, it's just absolutely needed.

COMMISSIONER SCOTT: Great, thank you. Did we have any last remarks from anyone on the phone, Ashley, or Tony, or David?

MS. HORVAT: This is Ashley. I would just say to Richard's point, I definitely agree on the demand charge front. In Oregon, we've worked with the IOUs to exempt EV charging from demand charges on one of the IOUs, but we're still working on the other and working with the other smaller utilities, as well. But having a statewide sort of solution is definitely preferable, of course. And we have almost 50 Fast Chargers and most of them are okay, but we do have a select few where our private partner is putting an astronomical bill that would not be sustainable had they not had that investment upfront; they're still having to foot the bill. So they are definitely obviously interested in mitigating that issue.

And then the other thing I just wanted to reiterate something I think I mentioned a couple of times that Richard has also said in so many words, but just amplifying not only leveraging funding but also amplifying funding through other entities, you know, you've got the hospitality industry, sports, utilities, green sports line is a great partnership to have if you don't already have that, you know, what better place to hit people than when they're happy at a game? Appropriately lubricated, of course, but…. I just think amplifying anything that we're doing through non-traditional EV industry mechanisms would be my recommendation.

COMMISSIONER SCOTT: Thank you, Ashley. Anything from David or from Tony?

MR. LOWENTHAL: I wanted to mention one thing that I left out, this is Richard Lowenthal again, and this is I guess a new phrase that I'd like Leslie to memorize, which is we need expansion grants. We don't need charging stations where they're not going to get used, we've got those already; but those hot ones in Palo Alto, in San Francisco, and now here where I can't park within a mile of "here" anymore and charge my car, those have to be fixed. So when you're directing funding in the old-fashioned way, direct it where we know there's an issue. Require us to prove that these charging stations are busy all the time before we add more and I think things will work out better.

MR. PETERSON: This is Dave Peterson from Nissan. Really, everything I wanted to say has already been said. So just to I guess reemphasize some of the points, definitely looking at MUD, I think Terry's breakdown of the question into really who and where and when, if those are the correct ones, I don't recall, but really who from the Energy Commission's perspective, who should be looking at it, and how they should be looking at it is really the right way to be thinking about it. I don't have any specific suggestions or policy recommendations, but definitely that's an area that needs to be looked at more closely and certainly the regional plans provide some guidance to that.

And then just the issue of Demand Charges and rethinking the role of utilities in growing public DC Fast Charging, I think Leslie Baroody made this point earlier, which was in the future the CEC would be taking a look at interregional infrastructure growth, and I think that’s probably an area that will require greater subsidy. And to Richard’s point, we don’t want to be siting chargers where they won’t be used, yet having a minimum viable backbone for travel and access to different regions of California will be important. But then to Richard’s most recent point about these hot spots, that’s where we do have significant, or where developers are faced with significant costs when it comes to transformer upgrades and demand charges. So any assistance or creative thinking around that would be welcome.

COMMISSIONER SCOTT: Tony, anything? All right, well, let me just say that I think this has been a fantastic discussion with a really expert and interesting panel, and so I want to thank each and every one of you for coming, for lending your insights, for giving us all this great information.

And I’d like to say that I know that you have probably all drawn on a lot of resources and expertise, data, and studies, and reports, and folks have mentioned surveys, so if you could make sure that you get those to us so that we’ve got it in our docket and on the record, so we have the kind of underlying background to refer to, that would be extremely helpful for us.

I'd also like to say thank you so much to my co-facilitator, Randall Winston, for coming over and helping lead the conversation, and to all of you for your engagement and the detailed interest in this. I mean, this is really important and we're excited to figure out what we think the next steps ought to be and to get going. And I don't know if you want to make any --

MR. WINSTON: Absolutely. Thank you all again so much for coming and lending your thoughts. We've clearly got a lot of, I think, tough issues to try to crack. And I want to echo again what I think Ashley and Tony from Washington said, we're doing so both here in California at the State level, and then at the National level where we do have a multi-state action plan. And so we've got tough questions to answer, but we're working to do so. And thank you all again for your input.

COMMISSIONER SCOTT: Excellent. So we're going to go on to public comment, which you are welcome to stay and hear, you can stay at the table, or if you want to go back to a seat you can go there, or if you have to dash off, that’s okay, too. But we’re going to transition into the public comment period. You should get your blue cards, as Heather mentioned at the beginning of the meeting, over to the Public Advisor, they’ll get them up here to me, and we’ll hear from folks about what they have to say, and then we’ll go to the WebEx folks, see who has got their hand raised there, and then anyone on the phone. So right now I just have one in my hand, and that is Joel Pointon from San Diego Gas and Electric.

MR. POINTON: Good afternoon. Hi, I’m Joel Pointon with San Diego Gas and Electric. SDG&E believes a robust charging infrastructure will increase the adoption of Electric Vehicles, which in turn will improve the local air quality. As you may have been aware, we filed a proposal with the CPUC in April, it’s to conduct a pilot program on Grid Integrated Charging. The pilot will include an innovative dynamic hourly rated rate coupled with enabling charging infrastructure to efficiently integrate and manage charging loads with the Grid. The hourly rate will vary by circuit based on capacity and supply and will be available one day ahead to its users. This process enables the EV customer to get electricity if they need for vehicle charging at the best possible price. The charging infrastructure will be installed in multi-unit communities and workplaces, as these are places where the customers park for the longest periods of time.

Currently over 50 percent of San Diego Gas and Electric residents live in multi-unit communities and most do not have access to vehicle charging. Over the next five years, 550 facility installations of 10 chargers each would be installed throughout the San Diego Region. Charging facilities will be installed and maintained by third parties to SDG&E’s specifications. The data collected from the pilot will help guide public policy on electric vehicle charging and SDG&E will be filing written comments with more information on the pilot. SDG&E is currently testing a similar charging system with its employees for workplace charging. Employees use a phone app or web portal to choose to charge their vehicle when capacity is plentiful and prices are lowest. Thank you.

COMMISSIONER SCOTT: Thank you. And if our commenters would be sure to get your business card to the Reporter, he would greatly appreciate that to make sure he gets your name spelled right and everything in the record, and also our panelists if you have a minute at the end that would be great, too.

If you have blue cards, please remember to bring them forward. I have Raoul Renaud next.

MR. RENAUD: Hi, thank you. I work here, but I'm representing myself, I'm not talking about CEC at all. In my family, we have two *Leafs* and between them we've put on about 30,000 miles, so I think we have a fair amount of experience with this stuff. And one thing I'm hearing about is these, I guess, did you call them "impacted areas" where the Level 2 chargers are over-utilized, there's not enough of them. I park at a Level 2 charger every day, all day, but my car doesn't need to be plugged in all day, two to three hours is all it needs. And I could go move it, but, you know, I'd have to leave the office and go find another spot and so on. I've always wondered why we just have one charger in front of a spot like a parking meter, why don't we put one charger in front of three spots, or even six. You know, three in front, three in back, so that that plug could be moved from car to car during the day by car owners. And as far as the etiquette of that goes, I just don't think there should be any question at a public facility like that should be shared. I don't think car owners are going to harm one another's cars moving the plug from one car to another, they're all in this together, you know. If there is a concern about that, or what would probably be even more efficient would be to have, say, the ChargePoint type of thing, but have three cords coming out of each one, and you could plug those into three cars, and it would operate sequentially so that once one is filled, then the next car would start, and so on. But I think you could make better use of the infrastructure that's there with very little cost. Thank you.

COMMISSIONER SCOTT: Our next comment is from Julian W. Carroll from Green Sphere.

MR. CARROLL: Hi. My name is Julian Carroll and I really am happy to be here today, this has been an excellent meeting. I have a background in City Planning, Transportation Planning, and Environmental Planning, and I’ve also installed some charging stations here. What I would like to do is, I’ve read all your Investment Plans and all your documentation, and I would like you to encourage City Planning staff to develop new parking standards to accommodate EV infrastructure where a stall location for a convenience, egress and ingress locating, and also locating transmission equipment so that it will be easier to provide these services. Also, I’d like you to focus on encouraging car dealership sales personnel training for automakers, they have lack of product knowledge, and they don’t explain cost recovery situations to purchasing these vehicles, I think, which is a big problem. And also I think consumer avocation by utilities companies through advertisement, pamphlets and mailings looking at cost savings for peak and off-peak kilowatt usage would be very helpful, too. In addition, I think the areas you need to focus on is 15 Fast Chargers at all State rest stops, utilize a multi-modal approach like the Professor from UCLA looking at infrastructure, the data of buildings, and how to apply conduit and change out panels in the cost recovery in that aspect would help residential owners see the price of installing new units. And then update train and rail plan updates, transit plan updates, to create incentives for investment to locate EV charging stations and public garages in central business districts, and locate EV Fast Chargers in all public streets, Cities like Berkeley is very creative and such things like this, encourage City and County Building and Planning Departments to resign parking standards to accommodate EV charging stations, continue to support workforce training investment and studying battery improvements. And also you have Caltrans, you could utilize all the data to look at post-mile data travel log, videos, segmentation data, and so forth, and with General Services you have a lot of parking lots, you can do it statewide. You have freeways that have vacant lots underneath them, those are great areas to put charging stations because you're located on the highway. And last, look at Port Authorities. Ports have a lot of money, they have billions of dollars and they have large areas to locate charging systems, and they’re always located near freeways. So I think the multi-modal approach is the best way to go. And then for your multi-units, I think you need to look at infrastructure and with condos looking at CC&R, Codes, Covenants & Restrictions, you need to put EV infrastructure in those. And thank you for your time.

COMMISSIONER SCOTT: Thank you. Next, I have Rodney Esteban from the Hybrid Haven.

MR. ESTEBAN: Good afternoon, I was over at the California Fuel Cell Partnership meeting over in Southern California recently and I had the privilege to meet Mr. Winston and also Tyson over there. I didn’t get to talk too much about what we do, we are a full service Hybrid and Electric Vehicle service center. Our first location is in Petaluma. We are looking to expand. In addition to that, we are also expanding in Japan. One thing that I did like hearing about on the panel, we talk a lot about infrastructure and what I definitely agree with you, Christine, is keeping it basic, reinvesting back into the people. I think by educating them and showing them the passion of all these vehicles that we do enjoy, I think just when it comes to Electric Vehicles, for me, my initial impression is like, you know, somebody who is non-social, somebody who is not engaged, but I think what we need to do as a community is to show people that there's a passion for these cars, that that translates directly into these types of owners. And by doing so, by reeducating people not only at these universities, at meetings such as the AltCar Expo, and like dealerships, I totally believe and I'm firmly for, you know, sales numbers. When it comes to the sales figures as far as used vehicles being a number that's starting to come up, what we want to do is not only service the vehicles but also try to transform traditional gas driven vehicles into Electric Vehicles, so not only do we work with existing traditional, but we can also upgrade to like an EV. I think that will help those people who do not have a current EV, but also have the opportunity to be a part of this community. That's basically what I wanted to say. I'm definitely looking forward to networking with some of you, definitely represent some of what the public's views are, I wish I could sit on a panel like this, there's a lot on my mind, but that's pretty much the gist of where my stance is. Thank you.

COMMISSIONER SCOTT: Thank you very much. I have next Dr. Michael Nichols from UC Davis.

DR. NICHOLAS: All right, thank you very much for the opportunity to speak. So a great workshop today, a lot of good ideas, and most of the ideas have been put forth, but one idea I didn't really hear too much and I've heard in other workshops is the issue of pricing. So I've heard Richard say that one way to double your infrastructure, triple your infrastructure, is to simply put a price on the charging and we can actually get more out of our existing infrastructure. So when we know that people will charge four times more in public than they would if you have a free versus paying scenario, to me that says we don't really know how many chargers we need -- or not necessarily that, it really depends. And I don't know if that's what goes into the high price scenario versus low scenario in the NREL study, but it really does depend. So I would suggest a way to kind of wean ourselves off of the free charging is to actually give people maybe vouchers for charging, so the charging is not totally wasted, so people who don’t really value charging, they’ll stay longer, but if they’re actually spending a voucher, they’re given $500 for charging, then they can draw upon their own account, it’s still free, so there’s still an incentive for people. But that will transition to a more sustainable business model and also help the people who are currently trying to make a business out of it. So that will help with capacity issues, the City won’t have to have costly panel upgrades if you can quadruple your infrastructure simply by putting a price on it. There’s lots of other things, but I would also like to comment on the gentleman who is a City Planner using the Caltrans model, we actually have a set of tools coming out in about a month that will look at charger siting and it’s a tool that people can play with, not a paper, but charger planning tools that will be freely available, so keep an eye out for that. Thank you very much.

COMMISSIONER SCOTT: Thank you. I have Ralph Troute from SMUD.

MR. TROUTE: Good morning. I’m Ralph

Troute, I'm the Project Manager at SMUD for Electric Transportation. Thank you for holding this group and to the panel, good comments and suggestions. With regards to the super charger fast charging idea, we've looked into that and the most expensive part of that is going to be the base bone, the backbone, designing the system for that capacity. If you're willing to fund that, you could make that something viable such that it's all there, and then you can add the Fast Chargers when usage justifies the expansion, but then building it with the idea that we will eventually have eight or 10 Fast Chargers, but then again helping to fund that expensive initial build-out will be a big help. As far as the MUD goes, that's a really tough nut to crack, especially in our district where the rules are sale for resale of electricity for profit is not allowed, so the apartment owner is saying, well, ROI equals zero. And I'm like, yeah, pretty much, so why am I spending this money? So the suggestion of a one-time grant to do that, great great idea. I like that a lot.

And also, as everybody knows, our Fast Charger site went operational just a few weeks ago. We just found out from some of the users that one of the local town courthouses, all the employees now drive BEVs because of the Fast Chargers, so they can get up and down the hill. So, yeah, build it and they will come, she's absolutely right. Thank you very much. Oh, one last closing comment, with regards to revenue sales for EV electricity, there's pending help from the NIST group with regards to National Handbook 44 on certifications of EVSEs for the purpose of collecting money for selling all the electricity, and we need to work on how we're going to do that. If you're not a part of the National Working Group for Handbook 44, we look forward to you joining the group as we figure out how to certify EVSEs as they're selling electricity by the KWH. Thanks.

COMMISSIONER SCOTT: Thank you. Let's see if we have any comments on the WebEx, and if there are others in the room who have a blue card that they haven't brought, please bring it up to our Public Advisor. Anyone on the WebEx, Heather?

MS. RAITT: I don't think so.

COMMISSIONER SCOTT: Anyone on the phone?

MS. RAITT: We'll go ahead and unmute the phone and see if people have comments.

COMMISSIONER SCOTT: Okay. I see one more blue card coming, I think that's our last comment.

UNSPECIFIED SPEAKER: There was a raised hand on the WebEx.

COMMISSIONER SCOTT: Oh, was there? I'm sorry. Was there a raised hand on the WebEx?

MS. RAITT: We don't see any. Okay, if you're on the phone line and if you want to make a comment or ask a question, now is the time. Your lines are open. Okay, hearing none.

COMMISSIONER SCOTT: All right. And Bonnie Holmes-Gen from American Lung Association California.

MS. HOLMES-GEN: Good afternoon. Bonnie Holmes-Gen with the American Lung Association. And I really appreciated being here today and I mainly wanted to make sure that you know that the American Lung Association is very invested in this effort with you, the Energy Commission, and with the State Air Board, to make this roll-out of Electric Vehicles successful. We see it as a key part of our state's air quality solution and ways to improve public health. We are looking for every way we can to help get the word out and clearly getting the infrastructure in place to support our EV roll-out is critically important. So we’re looking forward to working with you to continue to roll out the public funding we have available through the AB 118 funds, through upcoming cap-and-trade pot, we’re really excited about the mix of funding that’s becoming available now to help fill the gaps we’re talking about. While the home charging is really important and we’d like to see steps taken to make sure home charging is as convenient, easy and inexpensive as possible, I don’t think we had a lot of time to talk about that aspect of it today, how to really focus in on making the home charging more affordable and convenient for folks. I think that’s an important area to spend a little more time on. Certainly, we want to do everything we can to fill the gaps to have that safety net of chargers out there. And I’m really happy we’re talking about, especially as an EV owner also, I’m very happy we’re talking about these inner city networks of chargers, also. And I definitely notice that there’s a lack --

there’s a lot of chargers currently in Bay Area corridors, there’s less in the San Joaquin Valley, and I’m glad to know that some of our funding from 118 dollars is going to go to help shore up that network.

One key point I wanted to raise is that I hope as you go forward there’s also a lot of discussion about public awareness and public outreach, and we had a little bit of that today I think in the discussion about the importance of ride and drives, but I think public outreach is so important to this whole effort, both focusing in on the public health and air quality benefits of Electric Vehicles generally. We co-sponsored a report we released just last month with Environmental Defense Fund and this report looked at the health and societal benefits of transitioning to low carbon fuels, including electricity. We found $10 billion in health and societal benefits by 2020, $23 billion in 2025, and this kind of information makes it much more concrete that, you know, we’re doing this for the planet, we’re doing this for public health, but there’s tremendous economic benefit to society in reduced hospitalizations and medical costs, and increased quality of life, reduced greenhouse gas impacts through everything that we're doing. And this translates into real economic benefits. So in terms of public outreach, again, I think a focus on health benefits, air quality health benefits, also outreach on the increasing EV infrastructure to help give the public more confidence that this roll out is happening so that people can see the stations that are going in, see that there's a government investment and company investment in making this infrastructure real, and showing the actual increase, the percentage increase in station that we're experiencing. Anyway, thanks for taking some time for our comments and we appreciate this discussion today.

COMMISSIONER SCOTT: Thank you very much, Bonnie. I would follow-up to say please make sure that the report gets submitted to our docket so that we've got it on the record for this proceeding. That would be terrific.

MS. RAITT: Commissioner? I'm sorry.

COMMISSIONER SCOTT: Yes.

MS. RAITT: We did get one more comment from WebEx.

COMMISSIONER SCOTT: Oh, terrific.

MS. RAITT: So it’s Lisa -- I’m sorry for the pronunciation -- Xue? Did you have a comment or question?

MS. XUE: Hi. Can you hear me?

MS. RAITT: Yes.

MS. XUE: Hi. This is Lisa Xue representing NRDC. First of all, I really want to appreciate the effort that CEC has put into the Statewide Infrastructure Assessment which is an important action outline, and with that action plan we really want to thank the Commissioners and staff for holding this workshop to share knowledge and trying to sort in the (indiscernible) transportation sector. It’s been very valuable (Indiscernible) So as many of the speakers have noted in this workshop and previous workshops, there still remain many infrastructure gaps that need to be filled in order to keep up with EV deployment and penetration, and there was a lot of discussion about the government and I just want to echo what some of the early speakers have said, that government alone is not sufficient and it’s important to engage utilities, third parties, and other stakeholders (indiscernible)Sometimes you think more about the roles that other players can play and I do want to comment that utilities have to play the role (indiscernible) the infrastructure gas and as the vendor from SDG&E commented earlier their vehicle to grid integration example which demonstrates that utility system incent the transportation electrification. So, we just want to encourage the utilities to also think about innovative policies for grid integration (indiscernible) to leverage their resources in order to make sure that we support EV growth in the way that it will not increase burden our electric grid and increase cost to somebody else. Again, thank you for the workshop and thank you for the opportunity to comment.

COMMISSIONER SCOTT: Thank you.

MS. RAITT: That’s all.

COMMISSIONER SCOTT: Okay, well, thank you everyone for your engaged participation. I would just close the workshop by noting – and we kind of jumped right into this one today, so I thought let me just step back and remind all of us that the transportation sector is responsible for about 40 percent of the greenhouse gas emissions across the state, and that's one of the reasons why this is so important, as Bonnie Holmes-Gen and I think others mentioned when we had the Air Quality Management Districts here. We've also got regions around the state that have air quality challenges, and so making our way to the Governor's goals of one million Zero Emission Vehicles on the road by 2020 and 1.5 million Zero Emission Vehicles on the road by 2025 is just an incredibly important component of us being able to achieve our clean air and our climate goals.

I wanted to say thank you again to all of our terrific speakers and panelists today. I wanted to do a special shout out to my Advisor, Lezlie Kimura-Zito who kind of took the lead on helping put this together with Leslie Baroody from the Transportation team, and all of the other folks who helped support and put this together and also of course to our terrific IEPR Staff who helps us run great meetings. So thank you again, everyone, very much. Have a great afternoon. (Applause)

(Whereupon, at 12:26 p.m., the workshop was adjourned.)

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

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