ENERGY COMMISSION STAFF AND STATEWIDE PLUG-IN

ELECTRIC VEHICLE (PEV) COLLABORATIVE

PEV INFRASTRUCTURE JOINT WORKSHOP

BEFORE THE

CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

CALIFORNIA ENERGY COMMISSION

HEARING ROOM B

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APPEARANCES

COMMITTEE MEMBERS PRESENT

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Robert Graham, SCE

Michael Jones, Coulomb

Donald Karner, Ecotality

Alex Keros, GM

Andreas Klugescheid, BMW

Tony Markel, NREL

David Packer, Clipper Creek

Joel Pointon, SDG&E

Richard Schorske, ABAG

Russell Vare, Nissam

Diane Wittenberg, Chair, PEV Collaborative

APPEARANCES CONTINUED

PANELISTS

Dan Bowermaster, PG&E

Bill Boyce, SMUD

Joshua Cunningham, CARB

Dan Davids, Plug-In America

Bob Hayden, City of San Francisco

Dave Head, Sonoma County

Richard Lowenthal, Coulomb

Karen Schkolnick, BAAQMD

Sven Thesen, Better Place

PUBLIC COMMENT

Jim Bracy, EV Connect

Blair Calhoun, Sun Spots

Craig Childers, CARB

Barbara Cox, BEW, NECA

John Shears, CEERT

David Tulauskas, GM

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PROCEEDINGS

MS. BAROODY: Good morning. I'm Leslie Baroody. I'm with the Fuels and Technology Office, Fuels and Transportation Division.

Want to thank you all for coming today. We have a full day ahead of us.

I also want to welcome those that are listening in on the WebEx (inaudible) the agenda. In the morning, we're going to have a series of presentations and that will be followed by our first panel on residential charging at 11:00 a.m.

After that, we'll have lunch. And then in the afternoon, we'll have several other one-hour panels, one on commercial charging. We'll have another on corridor charging, public charging, and also workplace charging.

So we also -- I just want you to know between 11:30 and 1:00 there will be a hydrogen fuel cell lunch out front that's available for rides. That's from AP Transit.

So with that, I'd like to welcome Commissioner Eggert.

COMMISSIONER EGGERT: Good morning, everybody. Good morning. Okay.

This is going to be a participatory workshop. So we need everybody fully awake and engaged. There's coffee

upstairs if anybody needs a little caffeine jolt.

So I want to welcome everybody here today. My name is Anthony Eggert. I'm a Commissioner here at the California Energy Commission.

I guess of relevance, I sit on the Transportation Committee along with Commissioner Boyd, who is the Presiding Commissioner of that Commission. And I have to my left here Tim Olson, who's advisor to Commissioner Boyd and who may have a few comments.

And I believe we're also joined via the WebEx by Diane Wittenberg as the Executive Director of the Plug-In Electric Vehicle Collaborative. And I'll invite her to say a few remarks in just a couple minutes.

I want to just start out with three numbers: 80 billion, 100 million, and 40 percent. In California, we spend currently over $80 billion a year on products, of which about half of that comes outside the U.S. About two-thirds comes from outside of California. As a consequence, we're currently spending more than $100 million per day -- $100 million per day outside the state to buy fuel for our cars, our trucks, our trains, and our planes. I think this number -- these numbers tell a number of stories. They indicate how much money is at stake for our energy consumers and producers and how vulnerable our economy is to non-domestic, non-renewable

resource supply and the potential as we've seen even in recent years for rapid increases in the prices of these commodities that can wreck havoc on the local economies.

Forty is the percent that transportation contributes to California's greenhouse gas footprint. This is the largest of any single sector in California, and we know that greenhouse gas emissions if left unabated can create significant economic hardship for our local and global economies, including sea level rise, threatening our coastal infrastructure, rising temperatures, exacerbating air pollution, and human health, increases in electricity consumption during peak summer months, changes in precipitation patterns, stressing water storage and conveyance and agricultural systems, and extended and more intense fire seasons. So both of these factors -- or I should say these three numbers speak to the significance of our transportation and energy system and its influence on our environment and our economy.

So why are we interested in electric vehicles? Certainly, electric vehicles address our energy and environmental needs. For example, electric vehicles operating off of California's clean grid reduce greenhouse gas emissions by more than half. And that number is declining -- improving -- and will virtually eliminate petroleum consumption while allowing a more efficient use

of our generating capital and potentially, if we do it right enabling integration of internet and renewables.

But EV also has another potential advantage. And that is with smooth and quiet operation, fast acceleration, the ability never to have to go to a fast gas station, the possibility of fueling at home. EVs offer the potential for something that very few alternatives to petroleum can offer. And that is a better vehicle. This is important, because consumers drive markets and markets drive change. And the type of change that we're talking about that's necessary to meet our energy and environmental goals is truly massive. It's on the scale of $80 billion. And significant contribution to GHGs. So if we want to make that transition, we have to have a product that consumers will demand and be willing to shell out their hard-earned cash to buy.

To successfully prepare for an EV market in California, it's going to require a significant amount of collaboration. It's not any single entity that can do this on their own. It's going to require collaboration among government agencies, auto makers, utilities, infrastructure providers, and local governments, just to name a few. And that's really what today's workshop is all about, representatives from all those stakeholders groups I just mentioned are here with us today, and we're

very interested and excited to hear from all of you as to what types of strategies we should be pursuing to help facilitate an EV market in California, one that provides both the positive consumer experience and allows us to meet our energy and environmental needs.

So I think I want to just turn to Tim Olson here, Advisor to Commissioner Boyd, to see if he has any comments and then we'll see if we can get Diane on the phone.

ADVISOR OLSON: Thank you, Commissioner.

My name is Tim Olson, advisor to Commissioner Boyd, Jim Boyd. He had other commitments this morning and regrets his not being available to attend this. He's asked me to make a couple comments to the group here.

And I guess to add a couple more numbers, Commissioner, we think we have a pretty good understanding of what the pros for electric vehicles is. In the frame of reference of funding infrastructure projects in this first phase here from the Energy Commission, we're talking about maybe 30,000, 90,000 PEVs in the marketplace by 2012. That depends on a lot of things happening other than just the infrastructure. But from our projections of based on what we heard from you and other parties going back even to 2007, we think that a million vehicles is achievable by 2020. And some of you in this room are

saying, well, it's more than one and a half million.

And we've heard from other parties that this potential is likely to be based on at least one business model and that's following what happened with the Toyota Prius, that it took eight to ten years to get a million vehicles with a pretty interesting business model.

We're interested in hearing whether you have other business models and even in the course of this workshop or over the next six, nine months. It's very important to us to be able to justify the rationale for that projection. But we think that this is a plausible option that could occur.

As I mentioned, this is kind of the first phase. We're providing I think it's close to 13, $14 million from the Energy Commission for the first phase of this infrastructure. There's several different companies that have won those awards. We're very appreciative of having the matching money from the ERA from some of those. And where we don't have them, we're still willing to put the money out there. We're looking for matching money all along here.

And we also want to know a couple things: How are you doing in that process at that point to identify then and installing that infrastructure? Where is it going to be and when will that happen? Those are things

we'd like to see coming out of this workshop or in the near future.

This has a lot to do with influencing where we spend our next round of AB 118 money also. So that rational is important and that progress is important.

And some of you are going to be comment, well, we still don't have our award from the Energy Commission. That's another thing we want to know is your experience and trying to negotiate and get that funding in place. We're interested in looking at the lessons from that so we can modify our process, if necessary, and try to shorten that time frame to get the money out the door.

We also in the course of our workshop here and in the near future want to know what's the cost to the consumers, cost of the vehicle, cost of the fuel, in this case, electricity. That's a key part of understanding how this option is going to be competitive.

And kind of another question leading from that would be at what point does government incentives stop or phase out. And we want some insights about how your business models are going to change this dynamic over time, how long do we need to provide these incentives. We're going to reach a point here very soon where we start giving into 30,000, 40,000, 90,000 vehicles, there's not enough money in state government to cover the differential

cost of the electric vehicle versus gasoline. We want to know when does the infrastructure installation become a private sector investment. When does that pay off? And I think those are some of the key things we want to learn today. And if not today, we're open to one-on-one meetings with pretty much anybody here to get some of those insights. And thanks.

COMMISSIONER EGGERT: Thank you, Tim.

Those are all I think good and important questions that hopefully we can gain some insights through today's discussion.

And now I'm going to see if Diane is on the phone. So as I mentioned, Diane Wittenberg is the Executive Director of the Plug-in Electric Vehicle Collaborative, which is a private/public partnership. The California Energy Commission is a party to that partnership. But it includes again representatives from all the different stakeholder groups that I had previously mentioned, and that was formed I think partially because of this recognition, but it was going to require this collaboration to develop a strategic plan for the State and develop a strategy that we would need to have a successful transition.

So Diane, are you there?

MS. WITTENBERG: I am. Can you hear me?

COMMISSIONER EGGERT: Sure. Go ahead.

MS. WITTENBERG: All right. Thanks. Well, thank you for inviting me to say a few words, and I apologize to everyone for not being there in person. It's really a very impressive line up of speakers. I expect to learn a lot as I listen in. But I had to be here on call for jury duty, as all of us have to do from time to time. So that's why I'm not there with you.

The whole concept of the theme that was started by Anthony and Tim already this morning about stakeholder collaboration is really what Plug-In Electric Vehicle Collaborative is all about.

And just briefly to give you an overview, if you don't know about the collaborative, U.C. Davis Plug-In Hybrid Vehicle Center part of the ITS at U.C. Davis has been commissioned by the CEC to write a strategic plan to help make sure that the launch of electric vehicles is a smooth and as supportive in California as it possibly can be, because, hey, they are successful here. And we organized to aid that paper so it wasn't too academic, so it wasn't impractical in any way. We organized a PEV Collaborative that consists of regulators in the state, the Governor's office, elected officials in the state, auto makers, environmental advocacy organization, utilities, other thought leaders who sit around the table

and review the draft of this paper so when it comes out in December it will be a useful blueprint that would help people as they think through what do we need to do to most successfully support the launch of these EVs.

And as we've worked through the paper infrastructure in one of the hardest pieces and of course one of the most key pieces, it has to please the consumer, because in the end, this will not be successful unless consumers buy cars. And yet, you have to overlay the energy and environment issues and concerns that the State has on making infrastructure successful, although eyes wide and stating with care that electric vehicles are successful or not.

So we've been wrestling with this. And just to tell you where we are because we certainly haven't finished the paper yet and why it's important to incorporate much of what you say. Our most recent draft kind of talks about infrastructure in a very traditional way with residential, public, workplace, fast charging, and we're finding that we're evolving looking at these issues more in terms of how do we have a good policy that does accept off-peak charging without hobbling a consumer who needs and wants to use on peak charges. And how do we encourage private business models without too heavy hand of a government saying what you should and shouldn't do?

So even the framing of the infrastructure in the strategic plan is still in flux and what you all say here today. There are several members of staff of the PEV Collaborative in the audience. There are several members of the Collaborative itself, including Anthony and I, and we'll be listening closely and really expect to learn a lot.

So thank you for sharing today.

COMMISSIONER EGGERT: Thank you very much, Diane.

I guess now I'm going to turn it back over to Mr. Peter Ward, who's going to provide an overview of the key PEV infrastructure issues.

MR. WARD: Thank you, Commissioner. Thank you all for coming.

This is an excellent time (inaudible). Never expected it would be. This is a very hot issue here in California and I think in California related to electric vehicles. The world is rightfully looking toward us to see if we're going to pull this off. This is round two for PEVs in California. We have a significant knowledge base based on round one. So I'm happy to be here and happy you all joined us. I think we're looking forward to a very productive day.

I'm the Program Manager for the AB 118 Program, otherwise known as the Alternative and Renewable Fuel and

Vehicle Technology Programs. And we so far have spent about $15.3 million in EV infrastructure and we were matching the federal investment in California, of 55.8 million from the federal stimulus. We've got on the slate more than 4,000 new chart points to be installed. And basically the question that we'll be addressing throughout the day and on today will be how should the public part be allocated between residential, workplace, public, commercial and corridor charging. These are issues we're all very familiar with. And hopefully we can bring new light to those topics as well today.

Very happy that we're able to join with the statewide PEV Collaborative and join the strategic plan and the California Energy Commission, California PEV (inaudible) are joined in purpose to make sure that we lay the ground work and the foundation for what will be a very ambitious and successful opportunity in California for the PEV (inaudible) in two years time we had the announcement of vehicles. And we are rapidly getting up to speed with the infrastructure to make sure that those vehicles have a place to recharge.

I was just struck reading materials some of the acronyms (inaudible) we welcome them here in this space as well. We have the OEM, the AQMD, PUC, the NGOs, the POUs, the IOUs, DOE, CalETC, UCD, ITS, EVSE we all have to make

sure that we have adequate supply of, and the ARB and CEC as well.

I think it would be very important that we probably all agree that we'd like to have our PEV, our PHEVs, and our EREVs all (inaudible) they continually have an SOC of one half or more. That would relieve the range anxiety we've heard so much about.

Today, we're going to be discussing the various topics that I think are germane to this issue and are critical. We want to make sure our funds and the federal funds in California are spent well to establish the foundational slab -- if you will, we're pouring a slab and we want to make sure we have a lot of rebar in that so it will support future infrastructure investments.

Typically, if you look at the different areas, residential charging is one that of course is very attractive. We like to see as much of that as possible. And most of that would occur off peak. All charging, both Level 1 and Level 2 street side residential charging, multi dwelling unit charging, consumer readiness, I think coordination there's already undergoing on a regional basis all the planning many of the regional coalitions that have been at work trying to perfect over the last two or more years since the 90s, hoping that plug-in electric vehicles will be coming back as well; integrating

renewable energy into the PEV charging to the extent we can so utilities are charging with increasing percentage of renewables that we'd be charging from.

Workplace and sleep charging is an opportunity to (inaudible) a small portion of off-peak charging possibility. That is, we want to look at the employer and land owner incentives to install EVSE, coordination and outreach with employers, managing off peak charging and peak charging.

The next panel will be public charging on commercial properties. We want to make sure that funds are provided by State of California and the federal government (inaudible) business days and will be carried forward. It will be utilized, will be essential to replacement of those so that we can actually fuel up on electricity whenever they need to but also have a convenient (inaudible) to it (inaudible).

Certain PEVs have need based charging priorities integrating renewable energy for PEV charging and data collection. The data collection part is very important, because we are just trying to see how we're going to do this in the new century when the old century that we actually started these PEVs and the infrastructure established at that point. So the data collection of how we go about this will be essential as we walk through this

over the next several years particularly.

Public charging and corridor charging, these are very strategic elements of this. We don't know how many we're going to need. I don't think anybody in the room can actually say how much we need. (inaudible) public charging as much corridor charging. It's kind of flying by the seat of our pants, but we want to make sure that we don't over establish in any one area.

I think all the businesses in this proposition would acknowledge that as well. They don't want to establish something that will not be utilized. We are rightfully so careful as we go forward to make sure the foundation is true and level and go forward from there because this is the foundation that will lead to many, many more years of infrastructure establishment. (inaudible). Charging will be critical to provide convenience (inaudible) and fuel or many years. (inaudible) for public infrastructure, car charging and integrating renewable energy, and Americans with Disabilities Act requirements.

The contact information for the group here at the Energy Commission. And Leslie Baroody, she has actually earned this noble distinction to lead this very important and in fact moving area because she was the project manager for last year's investment plan. That was a

rousing success. So (inaudible).

So I want to welcome you all. Thank you for coming. And we look forward to a very engaging day.

COMMISSIONER EGGERT: Thank you very much, Peter.

And thank you very much for recognizing Leslie and her new role and the significant amount of effort that she put into preparing for this workshop today.

I think next up we have Russell Vare from Nissan.

Actually, we have Russell Vare from Nissan, Alex Keros from GM, and Andreas Klugescheid from BMW.

Do we want to have them come up one at a time? Okay. Go ahead, Russell.

MR. VARE: Thank you. Good morning, everyone.

I'll just get started, because I know time is brief.

I want to tell you about the Nissan Leaf that's coming out. I'm sure all of you have heard about it. It's 100 miles range, 90 miles an hour top speed, five seater that is what we're focusing on is affordability. So the price after the federal tax credit is 25,280. And one of the things that we focused on in order to get that price down is scale. So we've been investing heavily in manufacturing worldwide, and in order to bring down cost it comes through scale. And we do have a long-term commitment toward battery technology.

The battery sits in the floor of the vehicle, which is the best location for cabin space, safety, and for handling in terms of weight distribution. The vehicle -- and what we're talking about today is on charging and infrastructure. So can you see there's two ports to charge the vehicle located in the front. You have a Level 1 and Level 2 port and then also DC fast charge port.

The times to charge the vehicle, it's about eight hours overnight with the Level 2 charge, which is the recommended solution for most customers. And you can get an 80 percent charge in less than a half an hour with the DC fast charge port.

There's a lot of features on the vehicle -- a lot of information technology features. You can see it on the left. There's two timers to take advantage of off-peak rates. So you can have a weekend automatic charge time and a weekday charge time. There's other features where you can control that, be that the telematic system so you can set your charge times through internet or through an internet enabled phone, including the climate control.

There's the telematic system is also going to have a GPS system that's going to be able to track stations that are located around the country. And we're working directly with EVSE manufacturers to make sure that

that system is current and updated and updated over time so customers will have the availability to see the nearest charging station locations.

We've had a lot of interest in the vehicle. To date, we've had -- this is a little bit old. We've had 240,000 people who have signed up with the website saying they're interested in electric vehicles. We've had 20,000 people put down a $99 reservation.

And this shows you our timeline of where we started. We started taking reservations in April. In August, we began Aeroenvironment. Aeroenvironment Home Assessments. Aeroenvironment is our preferred vendor for residential charging. So they began to come to people's homes and do assessments on what it would take to install a Level 2 system at their home.

In September, we began taking orders for vehicles from reservation holders. During this time frame, October/November, we're starting installations of residential EVSE in the home. And deliveries begin this December. So we're on track. This is coming.

We've chosen to do our roll-out with the first five states that are part of the EV project, in December. Continuing to Texas and Hawaii in January; followed by the southeast next spring, and then rolling out the rest of the country the end of 2011.

And one of the things we've been looking at in terms of where we want to roll out the vehicles is making sure that market is really for electric vehicles and some of the things that Diane Wittenberg mentioned on the phone earlier that there's incentives for consumers, that the permitting process is streamlined, and enabling people to get home EVSE easily.

There's infrastructure available for customers to use both in workplace and public areas. And then that there's education and outreach programs to educate consumers on the benefits of EVs. And what we see in California is we've seen a lot of effort in this area, a lot of leadership, and we've seen at least from what I've been able to track a lot of EVSE installations.

Peter Ward mentioned over 4,000. I've been trying to do some informal tracking and have about 5200 Level 2 and DC fast charge stations going into California.

And you can see California is really leading the rest of the country in terms of the amount of infrastructure that is being planned.

This is by state. And this shows more by market. So the Bay Area, San Diego are really kind of leaders in terms of the amount of infrastructure we're seeing. So we think that California is going to be a good market for the Leaf and we continue -- we hope that the effort is

continued.

Thank you.

COMMISSIONER EGGERT: Thank you, Russell.

Next up is Alex Keros from General Motors.

MR. KEROS: So I'm posed to give a launch update. So I'll give you a little perspective.

Three Mondays ago, I received a call at 9:00 p.m. from one of my directors. A couple days later, received a call at 7:00 p.m. by a cohort, at midnight by another director. Last week, I received phone calls at 8:00 p.m., 9:00 p.m. and 10:00 p.m. on different days of the week. So to put that into perspective -- and all of a sudden what we started to hear was we're in launch mode. We are definitely in launch mode. My wife doesn't like it, but we're definitely in launch mode.

So to give you a quick update, many of you have seen this slide. I don't need to repeat it. Right now, the Volt's sort of value proposition is an extended range vehicle. The first 25 to 50 miles expected to be on EV battery only. And then from there, we have a generator essentially that can take you about 310 miles. So the total range of the vehicle extends to about 350 miles directly related to the learnings that GM sort of brought several years ago and many of you helped bring.

So vehicle purchase price is 33,5. That's

including the federal tax credit. Very aggressive lease price, very competitive lease price at 350 a month.

As Russell sort of implied, one of the aspects of these launch markets is to really focus and build, learn from the learning to develop. And obviously a key market in all of this is California, if not the key market. So you can see there it's sort of the northeast, plus Michigan, down in Texas, over to California is where we're focused.

That being said, the goal within GM is to be across the United States within twelve months. So this is as again Russell alluded to, the goal here is scaleability. Let's get these out here. But at the same time, let's do it right. We have to learn from what these early launches build on, build on that learning. Drive it into pretty much every part of the process from the corporate side to the policy side and move forward.

So the volumes, essentially model year 2011 what I'm launching is really about 10,000 units and then followed by 2012. We previously had said 30,000. In July, we upped that to 45,000 which would be production capacity.

Let's keep in mind as well especially for the Volt it's a little bit different than the best. But you know, we'll sell these cars in certain states. But there

are going to be people who are going out of their way to go somewhere else to get this car back into their home. And while we are certainly not going to go out there and sell it that way or market the vehicle that way, these things will happen.

So while the major communities are certainly communities we need to focus in on, let's say in California, the San Diegos, LAs, Bay Areas, Sacramentos, there are all those communities in between that will be getting these vehicles and taking advantage of them.

So launch mode, launch update, dealers are in the middle of it. I'm sure some of you have probably gone online and checked it out. Dealers are signing themselves up. Pretty much we're finding out every dealer is signing themselves up, given the threshold that they have to meet, which is some training, install some EVSEs, those sort of aspects. So those are moving forward. You can go on the website right now, customers can, and actually find a Volt dealership.

Likewise, as I mentioned, some of these non-major communities that are out there, we have dealerships that are actually getting certified to be service dealerships even though they might not be selling the Volt right away.

So you can imagine there is the whole set of infrastructure to get people educated on this. It's not

just the consumer. These dealers aren't used to the things they are going to start seeing.

So with that -- and certainly other OEMs and the utilities have been extremely supportive of this as well. We are taking these dealers. We're sort of immersing them in the technology. By no means is it covering the breadth of the issue. Think about how many years we spent in this room trying to figure out the nuances of what's going on and we're trying to get these dealers up to speed very quickly. These guys want to sell cars. And we realize that we have to sell everything. We have to sell a system to make it successful.

So these dealers immersion training is actually happening -- just happened in San Francisco last week, in L.A. today, is the last day, and then head down to San Diego and then move across to the launch markets.

And the bottom end there I know is a subject that's been close to a lot of people's hearts. But this is part of the launch is how do we get prepared, the utility notification. That is an issue we're bringing up to the dealers. It's important that they understand that, hey, when these customers are coming through here, this network needs to know, in particular, the utility needs to know when you're bringing a vehicle to our house or plan to. And we're making some other plans. But again, it's

this outreach. It's getting the message out, communicating so everybody is saying the same thing along the way.

Can't forget about the first responders. In many ways, they're some of our biggest technical supporters out there. And likewise, these sort of things are new. They have questions. There's high voltage. In many respects, they're comfortable with it because of their experience with hybrids, but at the same time, they are asking certain questions.

So again, when we talk education, outreach, it can't be just the consumer. It needs to be a breadth of individuals, organizations, policy makers, regulatory agencies. They're all involved in the brand-new paradigm.

The way I like to say this, imagine GM standing up with the major oil company next to -- announcing the launch of the Corvette. Now, there would probably be one person in the room in Bowling Green, Kentucky. Other than that, we are changing the way we are doing things and how do we bring all of these people in so they understand it and that we're not saying something.

One thing that we've already learned from our early customers, our early market research is every driver, every new customer is going to want to verify the information. So if the CEC says it, they're going to make

sure GM says the same thing. If the utility says it, they're going to make sure that the EVSEs say the same thing. So we really have to build some consistency.

And what's happening is there is a little bit of inconsistency. And when the customer finds that out, it just drives a tiny little wedge in there and they start asking questions. That's not what we want them to do. We don't want them asking questions about how the technology can fit in our life. We want them to experience how the technology can fit in their life. So a lot of work all the way around. And first responders are certainly close to my heart with my years with hydrogen in working with them.

So the Volt charging -- just to give you a quick update, 120 Volt quart set coming with the vehicle. Every vehicle will be standard. The 240 will be sold separately through SPX. SPX was announced I believe two weeks ago as our third-party provider. Certainly the worst kept secret I think this side of the Mississippi. But so SPX will be handling essentially the cradle-to-grave part of the installation associated with our customers. When somebody walks into the dealership, they will be provided a Volt advisor. That Volt advisor in a sense -- we'll call them a concierge. They will walk them through all the issues, learning, selling the vehicle. And one aspect of that

will be to give them to SPX. And SPX will be managing the installation.

So we've been working closely with the utilities in this state trying to develop a process that we all agree with that we can point to to say how do we streamline this. How do we better ourselves, frankly speaking. I think somebody said earlier -- Peter said it earlier, this is all real time learning.

And the most important aspect of this is designing a flexible system to be able to build in the learnings over time. So with that -- and particularly the SPX effectively is hardware agnostic. So GM will be selling its own 240 Level 2 EVSE. And likewise, SBX customers will have the choice of whatever EVSE they choose moving forward. In fact, our customers have the choice not to use SPX just the same.

So SPX will take advantage of the DOE programs that GM has signed with, Coulomb and Ecotality, and that will be a great relationship moving forward. Certainly believe we'll get a lot of learning as well.

The numbers for California are sort of yet to be determined, but it looks like there will be a base low plus X or Y for flexibility moving forward. And really, I think nobody can disagree with the bottom box there. This is really what it's about.

And we have to remember this is about the customer. This is really about the customer's experience. If the customer is not happy, we're not going to sell these vehicles. If we're not selling these vehicles, I promise you a lot of people in this room are not going to be pleased with us. So we know that. There is a lot of pressure on all of us to build the system. But we have to keep in mind what's the customer need? What's the customer's end goal and how is that going to evolve over time?

So with that, I will end and appreciate your time. Thanks.

COMMISSIONER EGGERT: Thank you very much, Alex.

And I'll just note that a lot of the presenters this morning are also going to be up here for panels later today, and there will be many opportunities to ask questions and engage.

So next up is Andreas from BMW. Welcome.

I also want to thank everybody for sticking within their time. We've got a very, very action-packed agenda today.

MR. KLUGESCHEID: Right. Just see that the Power Point may not work perfectly here.

But anyway, I will try to compensate it the best way I can actually. So I'm going to give you a little bit

of a background.

First of all, at BMW, we have 40 years experience with electric vehicles. We started in 1972 already with the first car and then progressively over the years had a number of different cars that were research cars. Always trying to understand how ripe the technology is.

And then in the -- well, at the turn of the century, we started a Project I with the mission to develop a mega-city vehicle or car, an electric car that is bound and perfect for mega cities and larger cities. So we sent around a group of researchers who are actually living in families in basically all five continents trying to understand the mobility needs.

And these research results were fed into our Project I with a number of features like unique and emotional design. That's something that probably every car manufacturer would like to claim anyway. But also tailor-made services, connectivity is a topic, lightweight material -- I'll return to that in a couple of seconds -- and many other features.

So our way from now to the mega-city vehicle -- and sorry the Power Point does not appear here. I'll try to compensate, as I say.

We currently have on the road already a few hundred Mini Es. Most of you are familiar with this car.

We have them on the east and the west coast, since mid 2009 actually. So well over a year now.

Then the Active E comes next year and then thereafter in 2013 the mega-city vehicle.

The Mini E again, most of you are probably familiar with it. Number of battery cells is 5,088, which is huge. The battery capacity is 29 kilowatt hours available. The range is FTP 7250 miles. Real world is around 100 actually. And it's basically a research car in a way, but also a car that is obviously given to the customers in order to understand the user behavior. We have a worldwide research project. We have it with U.C. Davis, and generating results in terms of what infrastructure needs are out there, what user behavior is out there, and so on, so on.

So the next car that is coming to the market next year is the BMW XFE based on the 1 Series. Not the car you see here. But if you think about the 1 Series coupe, it's basically in terms of the design, it's the 1 Series coupe. Difference to the Mini E, first of all, it's a four seater rather than a two seater. It has a reasonable amount of trunk space. And what is even more important for us, it already had the technical backbone basically of the mega-city vehicle in terms of batteries and so on, so on.

So that is mid next year available in the market for California. We're talking probably about several hundred cars that will be available. And then the mega-city vehicle that will come into the market in 2013 will be a mass production series car incorporating all the results and research that we made with the Mini E on the 1 Series and then being available worldwide and obviously also in the United States.

So the one special feature that I want to refer to in terms of the mega-city vehicle is the light-weight design. It's the first car actually that has an aluminum space frame, the so-called drive model where you can find the battery in there and so on. And then the actual body is made of carbon fiber. The carbon fiber is produced basically in a plant in Moss Lake, which is Washington state. It's produced by using hydro power.

So it's not only a sustainable car in a way, but the whole process for using the car is scrutinized and checked to make it as sustainable as possible to reduce the CO2 footprint as much as possible. That's part of Project I philosophy as well. So carbon fiber is expensive on the one hand. But on the other hand, it gives you the necessary advantage to bring down the weight of the car and, hence, compensating the weight gain that you have with the battery pack. So that's the mega-city

vehicle. But we'll see in 2013.

All right. One other thing that I just wanted to bring in -- and I hope I'll find that presentation here -- is the topic of renewable energy. I'm totally aware of the fact it's not about the PV rollout here, but I just wanted to add these figures just to give you an idea what BMW is thinking about fueling these cars.

And as we have here at the Energy Commission, I think it's worthwhile putting that argument into the game. And I saw also in the different models that we are talking about later on the pounds renewable energy always play a roll. So I just want to feed in that idea before we go on.

So with the decisions made, you will see probably in 2020 33 percent of renewable energy available in the California market. And, you know, it is an assumption at least this will be around 100 (inaudible) hour of renewable energy right here in the California market available.

When you think about the demands that electric cars have in terms of renewable energy, you will see that in two scenarios be 500,000 battery electric vehicles, let it be 750,000 battery electric vehicles, it would not even change to when we go for the one million that Tim was optimistically throwing into the game. We are around --

we are below one turret hour actually that we need to fuel these cars in 2020 when it comes to capacity.

So in other words, when you see that green graph noting the rise of available renewable energy in the market and when you see then the red graph, you see that the demand for electric vehicles being fueled out of renewable energy is extremely marginal. In other words, that can be done. And there are technical issues around it. You know, what can you do in terms of actually making sure that renewable energy ends in the car. That is something that we are exploring currently in our projects in Europe. But thinking only about the capacity, the message is that there is a good chance to actually fuel clean cars with clean power, and in California.

So that is something a bit out of line I admit but just wanted to share that thought.

COMMISSIONER EGGERT: Thank you very much, Andreas.

Next up is Mathew Crosby from the California Public Utilities Commission. Want to welcome you. The PUC has definitely taken a leadership role in the area of evaluating the utilities role in electric vehicle deployment, and Mathew is going to give us an update on the rulemaking that's underway. And also just want to recognize Commissioner Nancy Ryan, who's also been quite

active and is a member of the collaborative as well.

MR. CROSBY: Thank you, Commissioner Eggert and thank Tim Olson and everyone here.

My name is Mathew Crosby. I am the lead staff analyst working in the Energy Division of the Climate Strategies Section of the California Public Utilities Commission. So we are headquartered in San Francisco, but share in the sister energy agency designation with the Energy Commission here.

The PUC continues to be excited to be a part of this active dialogue with the Air Resources Board, the CEC, the PEV collaborative, the Legislature, and other State and local agencies to pave the way for significant increases in electric vehicle usage in the coming years.

So as Commissioner Eggert noted, my presentation is going to briefly give an update on PUC's alternative fuel vehicle rulemaking.

My role is staff of the Energy Division. So I just need to say it's limited to advising division makers at the Commission. And the Commission speaks through its decision. I myself am not a decision maker. So anything in this presentation does not constitute the voice of the Commission.

Having said that, for those who may not be aware, this is an overview of the PUC. It is charged with

regulating privately-owned electric, natural gas, some water and some Telco utilities. Californians spend more than $59 billion annually for services from industries regulated by the PUC. Five goals related to energy are related here, including promoting renewable power and increasing the impacts of California energy services on global warming.

This slide briefly gives you an update on the proceeding. The PUC opened the alternative fuel vehicle rulemaking in August of 2009 to consider alternative fuel vehicle tariffs, infrastructure, and policy, both to ensure electricity reliability and safety and to support GHG emission reduction goals.

In October of 2009, the Legislature passed Senate Bill 626 sponsored by Christine Kehoe, and that requires the Commission to develop rules to overcome barriers to the widespread use of PEVs in California by July of next year. And that bill required the PUC to address specified matters such as the electricity system impacts and how PEVs can be leveraged to integrate intermittent renewable resources, such as off peak when supplied.

In January of this year, the Commission issued a scoping memo prioritizing proceeding issues, including the nature of the Commission's regulatory authority over NEVs that sell PV charging services to the public.

In July of this year, the Commission unanimously approved decision 107044. The decision concluded that the Legislature did not intend that this Commission regulate providers of electric vehicle charging services as public utilities pursuant to Public Utilities Code 216 and 218. The PUC in the same decision identified sources of statutory authority to address potential impacts due to electric vehicle charging providers and help the state achieve its GHG and renewable energy goals.

On September 1st, 2010, however, two parties filed applications for hearing on this decision based on legal grounds, and the Commission is now deciding whether to grant re-hearing in parallel to Phase 2.

In Phase 2 of this rulemaking, the Commission is focused on developing a policy approach that makes open testimonial use of regulatory authority to achieve the goals spelled out in Phase I decision. It is focusing on priority issues, including but not limited to metering arrangements, existing rates for plug-in electric vehicles, utility customer education and outreach, and utility notification programs.

Concurrent to Phase I, the Commission approved a San Diego Gas and Electric request for approval of an experimental rate for the first 1,000 Nissan Leaf owners to measure how different on peak and off peak rate

differentials impact charging behavior.

Also here I've noted the Commission recently held two workshops in September related to the utility role and related to revenue allocation and rate design. And I have a couple slides that talk about those workshops. The Commission is targeting February of 2011 for a Phase 2 decision on priority matters.

So this slide again briefly defines the summary conclusion of the decision. It again concludes that the Legislature did not intend that the PUC would regulate charging service providers as public utilities, but that there are statutory authority to develop rules and to avoid adverse rate impacts.

Obviously, the policy context discussed here today is to reduce GHG and petroleum consumption and integrating renewable resources.

So in terms of implications, the decision discussions that the charging service provider will generally be an end use customer of the regulated load serving entity. So any net costs -- so impacts on the system net of benefits -- and when I say benefits, that could include, for example, improved utility asset utilization to the extent that charging occurs off peak, which would lower average costs for all rate payers. These costs net of benefit would be recovered through

rates if they are customers of the utilities.

And again, in September, the Commission held two workshops on priority Phase 2 matters. In advance of the workshop, the Commission Energy Division staff issued workshop issued papers. The first was entitled "Utility Role in Providing Heat and Charging Services." It provided general metering background, identified approaches to PEV load in single-family homes where the majority of charging is expected to occur for the early market. Three general approaches are identified, including single metering, sub metering, and separate metering. And metering functionality as it relates to price and load management messages is also discussed in the paper as it was discussed at workshops.

Some key questions now that the Commission is considering is do some metering arrangements better encourage or discourage technology changes or market developments. And related to this what are utility roll issues should be prioritized to minimize standard costs as the industry evolves.

Here I have two figures from the paper that identify the current or the status quo utility and customer side service point or point of demarcation. And this is useful for some of these questions as it relates to are the existing status quo arrangements sufficient

going forward for the early market and then for the later market.

Regarding rate design, rate design is a critical issue in Phase 2 of the proceeding. So the main questions here are each IOU currently offers special time of use selected vehicle rates. So are these rates scaleable? What should be the rate treatment for an electric vehicle service provider? Should PEV residential rates be opt-in and non-tiered? So not increasing block pricing? And should PEV rates include fixed demand charges like some customer industrial accounts might see a demand charge in addition to volumetric kilowatt hour charges?

This table provides -- which is also included in the paper -- just gives a brief outline of the minimal voltage that's required for services. So actually March of this year, the PUC, CEC, and ARB held a workshop where one of the investor-owned utilities presented research regarding some of the initial circuit testing that they have done where they do find that under certain circumstances, particularly for on-peak charging in some of their coastal circuits, there could be a risk of minimum voltage drop. And there may be a need for the utility to go out and upgrade that distribution in the work.

The Commission will also address issues that

overlap between the smart grid proceeding and the alternative fuel vehicle proceeding. And so the ruling on Phase 2 identified smart charging management incentives or direct charging management. There are various value streams associated with this.

So initial staff research finds customer utility societal value strings here, including distribution cost avoidance with stagger charging and wholesale energy price stability to the extent that a party can bid in off-peak load, that might make off-peak renewable energy more valuable.

But some of the considerations that we have to look at in Phase 2 of the proceeding are: Are these a priority issues, given all the range of issues that are prioritized by auto makers and others? Is this a priority issue? And are you -- existing utilities currently offer demand response programs. Are they sufficient to accommodate plug-in electric vehicles alone or are new programs needed?

What makes us particularly unique as it was discussed at some of the workshops we held is there may be a need to do risk analysis. To the extent that a customer participates in a particular demand response or smart charging program, what is the risk of the override? Vehicles are different load than -- the fuel for the

vehicle is may be different in this regard.

And that wraps it up. This is where you can get further information on the proceeding. My information is there as well as Andy Campbell, advisor to Commissioner Ryan. Thank you.

COMMISSIONER EGGERT: Thank you very much, Matthew.

And I would encourage folks to take a look at the white papers that Matthew mentioned. I think they raise a lot of interesting questions and had some really well thought out analysis.

Next up is Phil Misemer. He is from the Public Interest Energy Research Program, which is the California Energy Commission's Investment Program for Energy Research, one of the best investments in the state for energy research. And Phil is going to talk a little bit about our activity on PEV infrastructure.

MR. MISEMER: Morning. I want to talk about three projects that we have in development right now that relate to this topic and will hopefully inspire you to discuss them more with me at some point. The first -- I guess I better learn how to run this thing.

The demonstration in San Diego with a considerable number of Nissan Leafs being implemented provides a very great opportunity for us to learn more

about consumer behavior around these vehicles.

In 2007, the Energy Commission initially funded the Plug-in Hybrid Research center and recently renewed it as the Plug-in Hybrid and Electric Vehicle Research Center. The Director of that Center is a cultural anthropologist. That may seem to be a discipline considerably outside of what you might expect for researching electric vehicles but has proven to be invaluable at being able to survey and understand consumer attitudes, behaviors, and expectations around new technology, particularly electric drive. So in this demonstration, we're leveraging a huge amount of AB 118 funds with a relatively small amount of PIER funds to go in and better understand consumer behavior.

One of the most important opportunities in a new technology is to establish what are called baselines. In other words, to understand the initial expectations and let the demonstration run its course and then compare those initial expectations with the actual outcomes. So in this project, we'll be basically establishing baselines around four major areas looking at the initial recharging expectations for recharging and around the areas that you've heard today; home, work, opportunistic charging. How will they use these vehicles?

We have some initial theories on why people buy

them and how they will use them. Well, this will give us the opportunity to understand their initial expectations in purchasing the vehicle and especially how those matched up after owning the vehicle for some time.

And then using this information, another important piece of the research will help us bridge this what is sometimes a mystery between the initial market of the early adopters and the so-called mainstream market that we hope will be established once we've done the demonstrations and introduced the new technology.

So in summary, this project will examine the willingness of the customers to pay for these electric vehicles, the home charging constraints and how that effects their owner experience, to what extent will the existing 120 volt charging infrastructure satisfy the needs for these owners.

And while we are -- San Diego Gas and Electric is currently engaging these customers in a study to better understand the effect of time of use rates and other rate structures on their charging behavior. The follow-on question of that is how those rates effected their attitudes toward the cars. In other words, were there effects that either -- that might have improved their attitudes toward EVs or perhaps not improved them? And finally, we'll get some information on the

infrastructure costs associated with PEV implementation.

A project that's been underway at the Plug-in Hybrid Center for some time is examining the consumer behavior use of plug-in hybrid electric vehicles. That has given us some early information on charging, on recharging behavior in terms of spatial understanding, where they're recharging in terms of time, the time of day that they recharge, and the frequency of recharging.

This initially resulted in application of a GIS method of spatially displaying these behaviors and better understanding how these charge and behaviors will effect infrastructure to grid, distribution of infrastructure, et cetera. This project will be a follow on and expansion of that research to actually create a GIS-based tool.

That planning toolbox we have heard from some utility representatives, for instance, would be an extremely welcomed mechanism to better understand how to deploy the charging and what to expect the effects of that charging to be on their systems.

Finally, there has been a considerable body of work done in the concept of vehicle to grid, the idea of using stored electricity in a battery electric vehicle or plug-in hybrid electric vehicle and discharging some of that energy back to the grid to supply services, such as peak load mitigation, et cetera. It's an interesting

concept. It has some theoretical benefits. It has some downsides, too, as far as potential costs and complexity on the vehicle.

Another idea is to look at what is called battery to grid where at some point a battery is taken out of the vehicle because its energy characteristics are no longer suitable for propulsion, but that battery can have considerable life left in it useful for other uses, supplying power to a home, for instance.

So what we are going to do in this study is model the benefits of battery to grid and compare them with vehicle to grid and begin to get a better sense of the potential of these two possible approaches to improving the value of proposition, if you will, of the battery electric vehicles.

This, by the way, will be connected with a project we have underway right now with San Diego Gas and Electric, which is examining a proposed appliance -- we call it the household energy storage appliance that would use second use electric vehicle batteries in a smart grid environment and provide services back to the grid.

And that in a nutshell, is what I have to offer. I'm glad to talk with you about these projects.

COMMISSIONER EGGERT: Thank you very much, Phillip.

So next up we have just we're going to get a brief overview of the State-funded California PEV infrastructure projects. And we have first up Richard Schorske from the Association of Bay Area Governments.

Okay.

(Off the record from 10:18 to 10:20 a.m.)

MR. SCHORSKE: Morning, everyone. I'm Richard Schorske. I'm the Executive Director of the Electric Vehicle Communities Alliance. And I'm also here representing the Association of Bay Area Governments and our project partners in the Bay Area, EV Corridor Project.

We are a happy recipient of the -- here we go -- of one of the CEC awards, and that's why we are here today.

Our mission is to establish the greatest San Francisco Bay Area as the EV capital of the U.S. And this rather grandiose pronouncement was made by the three mayors of the three biggest cities in the region on about two years ago now. So Mayor Newsom, Mayor Read of San Jose, and Mayor Dellums of Oakland came together very early on to give some prominence and some push to this effort. And of course the way to that goal is acceleration of EV related infrastructure and EV friendly policies and incentives.

The ABAG has been the lead on this project from a

fiscal and a program standpoint with EV alliance in a facilitation role.

We have eight counties from the region, including some of our far south bay partners, the Monterey Bay Association of Governments and the Monterey Bay EV Alliance are also participants and a number of cities are independently represented within the partnership as well, notably San Jose and San Francisco. We have two of the leading EVSPs, EV service providers in the region and Better Place and Coulomb. They have been key members, as well as Clean Fuel Connection.

And of course, the regional agencies, notably the Bay Area Air Quality Management District and MTC have within the last few months been enormous contributors to this effort. Air quality district has provided five million of their own funds to EV infrastructure in the region to a separate program that they administer, and MTC recently has announced 14 million in EV-related grants. I'll describe some of that in a moment.

Our NGO partners include the Bay Area Climate Collaborative, which is a part of the Silicon Valley Leadership Group, College E Action, Monterey Bay EV Alliance, IBEW, and some Marin and Santa Cruz community foundations.

We had originally requested almost two million

for EV infrastructure, and we're fortunate to receive a grant of $504,000 with about a million dollars in local match tied to that. We're hoping with additional local resources to do about 337 chargers and 540 charge points.

As many of you know, the distinction there is that a charger essentially is defined by us as a billiard with possibly one or possibly two connect points, both Coulomb and Better Place and perhaps other vendors now have these so-called dual cord set units. So when we say charge point, we generally mean an individual charge connection or cord set.

And in the original grant, we had proposed quite a number of the Level 1 chargers to address municipal NEV needs, E bikes and legacy vehicles. We'll see in the final speck how that turns out. But that was our initial take was that the number of jurisdictions wanted those capabilities as well as a Level 2.

As I mentioned, MTC has come in with 14 million region wide. Our share of that for public infrastructure has yet to be determined, but we put about 2.3 million into a so-called funding reserve funding a study for in strategic structure deployment that's being developed as we speak, probably be done in January. So we're hopping with that we'll have the full complement of what we had proposed about 500 or so charge points out of this

combination of funds.

I want to just point out that information infrastructure is a key part of efficient utilization of this infrastructure, and we're looking at both mobile device information on operational status of the units, obviously, whether they're working or not, whether they're connect to the car or not.

And the city of San Francisco has an interesting pilot we're going to coordinate with whether the parking spot is occupied or not. And of course with just EVSE notification system, you don't know if the spot may be occupied, but the vehicle not connected. So there is a San Francisco pilot project. It's about $400 per space to wire up the space to find out whether the space is occupied. So many of the garages that are chronically oversold in San Francisco, that's an important and interesting element.

We're also looking at the possibility of an EV reservation system particularly for fast charge. For example, if you're driving to Napa for the day, there's only one charger there. You're vitally dependent on that fast charger to make a quick turn around and get back. You might want a reservation. We're looking at that with some of the vendors partners to see if we can't do something on that score. And I'll talk a little more

about EV infrastructure streamlining later.

This is just a quick overview of what MTC has done, a very creative set of projects that they've funded, a battery swap demonstration project with Better Place and number jurisdictions, a local government EV fleet project, co-sponsored with the Bay Area Climate Collaborative and an EV car sharing project with City Car Share of San Francisco involving a good number of lease. I'm not sure about -- I think there may be a Volt or two in that group as well. And that's specifically designed to give a lot more folks exposure to EVs in the area without necessarily going to a dealer or buying one. So this is a very exciting set of projects. And this is in addition to the 2.3 million that I mentioned for the infrastructure.

And I'll just parenthetically mention they put in 4 million into a bike share program that could build an infrastructure for E bike sharing sometime down the road, and the air quality district was a lead on that as well.

This is trying to get what is the big picture for infrastructure deployment in the region. As folks know, there are a number of other larger statewide programs that have had very positive regional impacts that includes about 280 public EVSE through the charge point program, about a equal number of residential chargers. I mentioned already the AQMD strategy. They'll be talking about that

more.

This is just one possible menu if you will of options that they have, including home Level 2 and fast charge. We think the fast charge is incredibly exciting. We wish that Nissan was doing standard Level 3 connectors as they do for San Diego. But we understand it's about a $2,000 option package to get to the fast charge. So hopefully the dealers will be pushing that in connection with the regional fast charge deployment, which can be a very exciting data opportunity for all of us.

And then Clipper Creek is also doing quite a bit in the legacy switch-out world, and all of that adds to what we hope will be as many as 1,000 plus chargers deployed in the next 12 to 18 months in the region, again public chargers.

This is just an example of some goals that we kind of put up on the back of the envelope for a collaborative. We took the 70 percent of electric miles -- 70 percent of all miles being electric miles by 2040. That's the Electrification Coalition goal nationally. We think that's a great formulation. It gives some focus to high mileage vehicles like taxis that are disproportionate VMT generators. So some clarity on the policy.

And, of course, the 2050 goal is aligned with

CARB alternative fuels vision. So we can to see if we can't figure out a guide path, that gets us there with electric drive.

Our corridor work plan is pretty straightforward. We mentioned already operating standards for the vehicles -- I'm sorry -- for the EVSEs. Some of our vendors are collaborating on this issue of roaming and billing. We have many different utilities districts in the region, although PG&E is the dominant player, but we have several municipal and community utilities as well. So the issue of billing is fairly consequential. Palo Alto, Santa Clara, Marin County all have municipal utilities as an example.

Coulumb has a grant from CEC to integrate multiple EVC peak grants into a demand reservations system. They're going to be working that out with other partners. And we as a partnership have really strongly supported the notion that network EVSEs is the way to go for demand management. We do not want a situation where we become a problem for the grid or become a generator of high intensity electricity -- high GHG electricity in the future because we deployed too many dump chargers. We want these all to be demand response capable, if possible.

Obviously, the establishment of incentives is an ongoing process and one which will be assessed in the

study that I mention coming up and ongoing. But we think that now with SB 375 targets haven't been set regionally and the ARB having indicated that if you turn the curve on emissions more than what the state guide path says for LDVs, then you are going to get credit for that under SB 375. That is actually a very significant policy direction for the region because it puts EVs into the bucket of core climate solutions under SB 375.

So it won't just be about VMT and land use. We think that's really important, and it's giving a lot of visibility to EVs to climate action planning in the region, and we think that a number of facilitative policies around road access pricing, parking pricing, and so forth can follow from that focus.

Just quickly, we're looking over time to accelerate some of the pilot projects that are already ongoing on V2G and smart grid integration. A number of partners are already engaged. Some of you know Google and PG&E have been working on this with others. We're hoping to step that up with some DOE funding in the region.

We have hopes that E-bikes just read a Pike Research report. A half a billion E-bikes are supposed to be sold in the next few years and mostly into the Asian market, but should be great economies of scale.

Battery price is coming down and that could be a

real important transportation and climate solution as we go forward. City Car Share is very interested in that, looking at it very closely. They have the infrastructure already for reservations and to some extent their car pods are equipped to serve E-bikes as well.

EV ready auto tech workforce, we've facilitated some grants for local community colleges with CEC and ERA funding. Streamline installation process, we've begun that with very important development of guidelines by the International Code Council, one of our multi chapter groups most in the Bay Area and much of the far South Bay is included. And they have developed common code guidelines that's available now to any of the ICC chapters in the state. It's not the whole package of issues by any means, but it at least gives guidance to inspectors on some of the issues.

We're developing ADA guidance. I am with Clean Fuel Connection. With support from EPRI, we hope to come out with something very soon. Very troubling issues there which we won't get into. But as everyone knows, local jurisdictions are very concerned they're going to have to devote their first public EVSA to a handicap space without fail. Maybe even not allow the next door space to use that charger because that would be not available to handicap driver. So this is a tough issue that we need a

lot of help to resolve.

We have some grant funds pending with CEC to provide support to other regions in the state on these issues by our Ready, Set, Charge Collaborative, and we hope to have some more announcement on that in the coming weeks.

And finally, the EV friendly building codes and public work codes guidelines, you know, we have already evidence a few garages have been done with stub outs. The cost of installation there is about $1,000. It ranges 8,000 and up for those that don't have stub outs. This is a massively important task, even though it's a longer term to realize the benefits, the savings will come into the tens of millions. We really want to get on this. Every city has to have these. Codes are done city by city. You can't do them statewide. You can suggest them statewide, but we're really looking to dig in and get those done everywhere we can.

We were asked to look at the issue of public versus residential charging. I'm going to make this quick. But early adopter reports are going to be incredibly critical. We really need those to be positive. We need to relieve range anxiety for BEV owners.

Some of you have seen New York Times and other articles that basically are already suggesting this is

really an inconvenient form of transportation. This is a major problem. We do not want that happening throughout the year. We want to get on this. We want people everywhere to see that we are in EV ready region. This means visibility. Visibility is more important than utilization at this point. We just need to get these things out there. They're advertisements for EVs, especially for BEVs, and also for all electric miles for PHEVs. It's not just about the BEV market. It's also about making good and full use of PHEVs in all electric mode.

The TEPCO study, which many of you are familiar with, shows somewhat counterintuitively shows the more charging and fast charging you have out there, you may have no increase or even decrease in charging utilization because folks have their range anxiety issues solved. That's a very interesting finding. We want to give some visibility to this for policy makers so they don't judge the value of the public infrastructure deployment by how often it's used. That's not the point.

The point is it's there in emergencies for opportunity charging. It does not need to be used a lot to be extremely valuable. And study first we're suppressing the BEV sales and the self-fulfilling prophecy of non-utilization of EVSE because there's just not a lot

of vehicles out there. So we think there's good cause for robust early deployment and we're pushing on that.

And then to address the question of what is public charging, obviously public charging includes residentially focused charging that may be in public rights-of-way. And so we want to make sure that publicly accessible MDU and street side charging is prioritized. 50 percent of Californians don't own their own home or have a garage. That's a massive market we can't ignore. We think early adopters -- we need consumers with garages. Don't need more subsidies. That's maybe a little strong, but they definitely don't need as much subsidy as somebody that's in a rental because they can't afford their own home.

And we do need to systematically tackle MDU charging with public funding now. It's considerably tough to do. It takes months of negotiations with HOAs and building owners to get these things installed and to prepare for the second wave of marketing to EVs to cross the so-called valley of death for innovation. We think we need to get MDUs and do it systematically, and we need some public funding to do that, particularly to fund the transaction costs. The installation costs are probably no greater than the transaction costs when you're talking many, many conversations with apartment and multi-unit

development owners.

So how many public EVSEs is enough? It's surprising to see the range here. Electrification Coalition published a study, a road map, that said early deployment one-and-a-half to three-and-a-half EVSE per car. I don't know where they got that. They just put it in there. It wasn't footnoted. A half to one-and-a-half per vehicle maybe when there is a lot of deployment of chargers in the space. RMI came out with. Six public chargers per vehicle. You know, who knows.

What we are looking at in the Bay Area is we think we might be able to get to 3,000 EVSE, and we're looking at 15,000 to 30,000 PEVs over the next couple years. We think that kind of a ratio would be desirable. That's like a one-to-five or a one-to-ten. And that's not anywhere close to these numbers, these higher numbers. But right now we only have about a thousand in the pipeline, and we think to support that 15 to 30,000 EV PEV number we (inaudible).

This is our best guess. We actually did a lot of work on these numbers, but they're just everybody's guess like anybody else, pretty random when you get right down to it.

But just to give you a sense of what we're looking at in terms of EVSE to car deployment. And for

those that are interested, this is some math. We looked at a 50/50 split of BEVs and PHEVs and we got these kinds of CO2 and gasoline savings with some very, very conservative numbers, really obsolete numbers on gas and maybe an overdue on the electricity price. There's already EV rates that are significantly lower than nine cents a kilowatt. So we're hoping that the savings are actually even greater.

And that's it. Thank you. Thank you, Richard.

COMMISSIONER EGGERT: Thank you, Richard.

Next up we have David Parker from Clipper Creek.

MR. PARKER: Morning. Thank you for having me. I'll try to catch us up here a little bit. I just have a quick overview of what our project consists of. If I can hit the right button here.

Our grant request was to redo all the existing infrastructure in the state of California per EV charger. We have about 600 sites, about 1271 stations, and they consist of our old EVI stations, a lot of large plant peddle inductive and a lot of small peddle inductive.

One of the things that we're going to try to incorporate was not all the hobbyists and EV drivers that have come and kept the flame alive over the years, so we were going to try to maintain one of the small peddle inductive wherever they existed and were being used.

We're going to make inlets available, the new SAEJ 1772 inlets available to existing drivers, so they can modify their vehicles compliant with the new standard and take advantage of the charging infrastructure that we were changing a way that they were currently using, but not only be able to use it to the new standard and take advantage of all the new infrastructure that was coming into the market.

We're also going to -- as Tom Dawling being part of our group, we were going to maintain and update the mapping. And just I note that all of our products are made in California, except for the inlet, and all the subcomponents are sourced in the state of California. Just, jobs seem important.

Our partners are EV Connect. They're out of Huntington Beach, California. Rue Phillips is the brain trust down there. I don't want to insult some of the other employees of EV Connect. But Rue has installed -- he's been working in this market for a number of years. He did a number of the installations originally back in the 90s and early 2000s. And their installation service network covers the entire state of California. In fact, it pretty much covers the country, but the folks in California. And they will be the ones assessing and actually doing the work of refitting all the existing

sites.

We also have Tom Dawling who obviously is the manager of the EV Charging News of all of the existing mapping that's going on. And he's part of the group, the Electric Auto Association who's been maintaining these sites over these years and make sure in some form or fashion still operable. And Tom maintains EV Charger News and keeps that updated as well as a number of other sites that are coming on line to support this effort. So Tom will coordinate with all the site owners, which may be one of the most daunting parts of the task is finding somebody there to sign off on the work and allow their infrastructure to be updated.

The project that was awarded -- we didn't get all the money we wanted. We're not complaining. We got about half the money. So we'll be able to do about 500 to 600 chargers. But we're finding working with local entities money available or private entities willing to come forward to help with the funding. And I think by the end of the day we'll be able to do just about the project that we originally scoped only with just half the State's money, which is guess is probably better.

And again, we'll maintain one of the small peddle inductive sites. We maintain all that part of the project. So make the inlets available. Maintain the

small peddle inductive on site, maintain the mapping. So that part of it stays whole. We just have to do less sites as scoped now.

The current products, some of the products enhancements that we are looking at, as I mentioned, the funding from other sources allow the units to the be smart grid enabled, which we think is key. I think it's been mentioned numerous times they all have to be smart grid enabled for demand side management. And again, more funding is becoming available to help complete the project.

If you have any questions, please contact me.

COMMMISSIONER EGGERT: Thank you very much, David. Thank you for your concise description of the program and also thank you for stretching the State dollars. That's very encouraging to see that being matched with the private capital to expand the program.

Next up is Michael Jones from Coulomb. Welcome.

MR. JONES: Good morning, everyone.

I'm going to today just kind of give you a little brief of our federal program that we got through the DOE to give you the context and how that will relate to the CEC money that is a follow-on or inter-dependent to the program that we're deploying at large, specific to California. I'll give you a little better scope on how

we're going to be working today.

So just to kind of briefly give you a quick overview here, we've received in June of this year a grant through the ERA funds basically awarded through the Department of Energy for 15 million dollars. It's a 37 million dollar project -- to deploy approximately 4600 stations in nine metro areas across the United States. Those areas are in California are Los Angeles, San Francisco, and Sacramento. The areas outside of California would be the Bellview, Redmond area, Detroit, New York, Washington, D.C., Orlando, and Austin.

So the project is really to build a public private infrastructure to demonstrate vehicles with our OEM partners, which are Ford, GM, and Smart. We're going to be providing vehicles that we're going to be tracking as part of the program and getting the lessons learned. So Phase I is we're already underway is basically a deployment phase and I'll discuss that a little bit.

And then Phase 2 is really the data collection piece, which as we all sit here today and talk about it is really -- there was a lot of good questions that are being asked here today in this forum as we go through. And you're going to hear a lot of answers.

But one thing I really want to point out is that we don't have solid data to make definitive answers to a

lot of the questions that are going to be answered today. And it's these pilot programs and demonstrations that we're running and the analysis that's going to go along with that that's really going to help formulate solid long-term directions and make the kind of decisions that we need to make going forward.

So the scope of this program is first and foremost to demonstrate the viability of the electric vehicle infrastructure. So we're being encouraged to go out and tackle a lot of different market segments: Residential, commercial, public, private, fleet depending on where your applications are. We want to get as much infrastructure out and spread across as many different types of segments or entities as possible so that we get a good asset coming back into different niches that we're going to be wanting to analyze. And we want to get this stuff out quickly.

So that was the other thing that you've heard today is get that infrastructure especially in the public market out and deployed as quickly as possible to give the EV buyer the incentive to know that there is an infrastructure out there that he can rely on and you can buy a car.

We're going through and obviously coordinating with a lot of the different stakeholders in the regions,

policy makers, utilities, regional groups, governments, to get a sense of what is necessary to bring this project into different regions.

And I point out just some of our lessons learned as we go along is that there are significant differences between regions and how they operate and what may be the right solution for one region may simply differ a little from another. But we'll learn that as we go along and through the program.

Next we're basically like deploying both residential and public commercial side stations. So it's really multiple programs through the OEMs. They'll be presenting offers through their own channels for stations into the private residences or through the purchase of vehicles on the other side of the program. We're basically going out and through either direct marketing or web marketing we're looking for people in the public and private sectors to engage and determine if they want to put these stations in the ground.

And then the last part of the program is a data analysis. We're currently partnered with the Idaho National Lab and Purdue University. And they're going to be taking all the data that we collect over the network on how it's being used and correlating that to other different projects and data sets that they're getting and

see if we can't get a good sense of where we should be going in the future.

So this is just a quick slide to show the different vehicles that are in our program, the Chevy Volt, the Ford Transit Connect, the BEV, the Ford Focus BEV toward the end of the year and the Smart Ford II and the regions that it's going to be deployed in the specific regions that we're operating.

So I said the program itself is underway. We basically are marketing -- actively marketing, installing stations today. We're continuing to ramp up and we hope to have most of the public side fully wrapped up by the second and third quarter of next year.

There will be a little bit on the residential side of the stations for the last vehicles coming into the forth quarter of 2011. We're also doing a lot of local media events just to generate interest. The next one here in Sacramento is October 27th. And then so where this comes into California and what we're doing is the matching grant from the CEC which is a pool of $3.4 million where we're looking to roughly deploy a minimum of 1290 stations into residential public and commercial applications. The mix of that is yet to be determined. The CEC grant is primarily funding the installation of those devices that we're going to be putting into through the federal

project. So overcoming a lot of the hurdles with the early adopters relative to costs or cities or the other constraints that they might run into.

This is just a real quick slide to go over the details of the different models that we're dealing with. We have a full range of public and private models that are all networked in multiple mounting configurations. So we have a pretty flexible product line in both Level 1, Level 2, and actual fast charging. But fast charging is not a part of this particular program.

So where we're at today is at this point in time to have about 75 percent of our hand raisers identified in -- locations identified in each of the regions. We're very close to that goal right now. That means they're basically in different stages of either contractual negotiations or site evaluation phase or actually even potentially underway with installations.

Once all this is done in the first quarter, then we basically get to the 24-month data collection. We're going to be analyzing all the data about who's using the network, what times of day they're being used, and really kind of just learning what we need to learn and go through it. So that's kind of a quick overview. I hope it's helpful. And thank you.

COMMMISSIONER EGGERT: Thank you, Michael.

Donald Karner from Ecotality.

We're running a little bit behind, but I have a plan to catch up. So do not fear.

MR. KARNER: Great. I am Donald Karner, and I come today really wearing two hats. First, I'm President of Ecotality North America and represent our Blink brand of electric vehicle infrastructure; and secondly, the Project Manager for the EV project, which is our public/private partnership between Ecotality, the U.S. Department of Energy and the California Energy Commission.

These two hats that I wear have different but very synergistic objectives. On the Blink side, our objective is to always make electric vehicles charging and infrastructure an asset to the electric utility grid and never a liability. And on the EV project side, we tend to demonstrate how we can accomplish this and look at various ways to implement that.

So for both the Blink brand and our EV project, we utilize smart charging to achieve our goals. And from our perspective, smart charging is basically making charging energy a dispatchable mode. Making electric vehicles/electric vehicle infrastructure dispatchable to the grid so it can be controlled inversely with the way you would control generation.

So all of our Blink and EV project chargers are

both Internet connected so we can both control the chargers and collect data from those chargers as well as they have an interactive screen to allow us to interface with the use of that infrastructure in a real time fashion.

So using the data that we collect to understand the state of our customers then allows us to adjust when we charge them, because we know how long it will take to charge them. We know what time we have available to charge them. And using that data and the intelligence that we provide in the back office we can then move charging around to accomplish a number of objectives in support of the grid and do that very transparently to our customers.

So in combination with control and data, we have the ability then to schedule charging, to make maximum utilization of renewables and BMW showed that's a real opportunity for EV charging. We also have the ability to never allow EV charging to impact peak demand in excess of what generating resources are available. We never want electric vehicles to cause another power plant to be built.

We also have the ability to provide grid regulation services. The spinning reserve that typically is provided by burning fossil fuels and keeping a

generator running we can provide with load regulation via the demands/response or the control that we have over charging.

And we provide additional kilowatt hour sales over which utilities can spread their fixed costs and lower the costs of electricity to all customers, including existing customers that don't have electric vehicles.

So through the EV project we'll be deploying about 5,000 residential and commercial EVSE in California, in Los Angeles, and in San Diego. Total project, over 15,000 chargers across the country.

We're working with electric utilities including San Diego Gas and Electric, Los Angeles Department of Water and Power to integrate these smart chargers in their electric grid to provide information to help them understand how best we can integrate infrastructure into their electric grid.

We're also working with other stakeholders, including the CEC, to provide information on infrastructure utilization, OEM on vehicle utilization so that we get a very good snapshot of how mature infrastructures will operate and how we can best roll out infrastructure going forward.

I've been asked to address the mix of residential versus commercial charging infrastructure. And to do that

in our markets, we typically start with what we call a micro-climate planning process. And there we try to mix Ecotality's two decades of electric vehicle infrastructure experience with the experience and the needs of local stakeholders to develop a plan for beginning with essentially green field, no infrastructure, and rolling out that infrastructure in a ten-year planning process.

As a result, there are a number of factors that impact the micro climate and this ratio between commercial and residential charging infrastructure and probably the biggest of which is just the state of development starting with the clean field or green field. Obviously, the first infrastructure that's coming in is residential. You need vehicles. People will buy vehicles. They'll install infrastructure in their homes.

As then commercial infrastructure begins to develop, we believe that fast charging will be the first thing that will deploy. Then as the infrastructure becomes more mature, a rich Level 2 infrastructure will follow and fill in at retail locations, employer location, those types of locations where essentially EV owners can then charge their vehicle where they lead the rest of their lives. They'll be able to charge where they sleep, where they eat, where they work, where they're entertained, where they shop, and become develop their own

electric transportation lifestyle.

But the micro climate in this ratio is also impacted by other factors including the area demographics, the local topography, climate, existing traffic patterns, just to name a few. So we believe that commercial charging that's in our lexicon that's just charging away from home, whether it's on public property or it's on privately-owned property, an integral part of any charge infrastructure and it's critical to rolling out a successful EV deployment. A commercial charging provides the ability to untether vehicles from their home, to allow them to expand their usage and utilization, the ability to provide daytime regulation services to the electric grid, reducing the cost of charging to all EV owners and the ability to provide other business services associated with charging and the development of this electric transportation lifestyle.

And that's a very important aspect of commercial charging, because it doesn't take a lot of economics to realize you can't make a business out of just providing energy for charging and commercial space. You just can't make the numbers work, particularly when you're competing against residential charging, which has the lowest electric rate, the greatest convenience. So there has to be more. There has to be something else that's provided,

some other service, some other opportunities associated with commercial charging or commercial charging as soon as government incentives go away will die. And we don't want it to die, because we don't want vehicles to be tethered to home. We don't want vehicle penetration to be limited to those missions that can be tethered to home.

We want a rich infrastructure to develop. Therefore, we see commercial charging is critical the both the successful and rapid deployment of plug-in electric vehicles as well as to the rapid deployment of a business case to support a vital deployment of charging infrastructure with the objective of getting government out of business of developing infrastructure and turning that over to the private sector.

Thank you. Thank you very much, Donald. So I think right --

COMMMISSIONER EGGERT: We're going to take a ten-minute break. So I'm going to ask everybody to be back here at ten after 11:00 and we will resume the discussion and then we'll also move into the panels. And I'll provide an update on the actual schedule once I clear it with the folks here. All right. We'll see you back in ten minutes.

(Thereupon a recess was taken from 11:02 to 11:13 a.m.)

COMMMISSIONER EGGERT: Okay. Welcome back, everybody. We're going to go ahead and get started here. So we are a little bit behind, but I think we can catch back up.

I'm going to give just an estimate here of the revised schedule. There was also some ambition here that we schedule one of these discussions right over the break so we have to accommodate that as well. So we're going to go ahead and hear from the next several folks on the implications of the sales ratio of battery electric to plug-in hybrid electric vehicles. That's going to take us to 11:30. And then we're going to actually hold the hour for the residential discussion. So we're going to go the lunch a little bit late, 12:30. But don't worry. We're going to give you a full hour. In fact, you might even miss the early rush hopefully. So give you a chance to get a bite.

We will reconvene at 1:30 for workplace and fleet. There's going to carry us to 2:20. So we're going to have to make up a little bit of time, cut 15 minutes out of that, 2:20 to 2:55 for public charging. We will take a little bit of a break and then we'll reconvene at 3:10 until 4:00 for public charging and corridor planning, and we're going to try to hold the 4:00 public comment so that we give folks an opportunity to provide public

comment. And hopefully that will give us enough time to get into a good discussion during the panels as well.

So with that, Bob Graham is here from Southern California Electric Company. And welcome.

MR. GRAHAM: Well, thank you, everybody, for allowing us an opportunity to comment. After listening to all the presentations this morning, I think I'm going to actually make this shorter to we can help catch up a little bit. And you talked to Tony a little bit and he's going to make a couple comments to follow up on what I had.

The presentation is built on the presentation I gave back at the plug-in 2010 conference in San Jose. And I told Bob Hayden I was going to give him credit because he was kind enough to come up to the podium and say, hey, he did a great job. So I figured if he thought that, then I can repeat it and use it again.

Southern California Edison is paying attention to all the things that you're talking about and trying to understand what the market penetration is going to be, especially in the area of battery electric vehicles versus plug-in hybrid electric vehicles, because that 240 40 amp charge requirement versus 120 15 charging requirement makes a huge deal to us in terms of what the potential impact would be on our distribution infrastructure.

The other thing we're doing paying attention to all this data is to try to reach out and educate our 180 cities, six counties, 14 million people to try to get them ready for this onslaught of plug-in electric vehicles coming into our region. And we do expect to have the largest concentration of plug-in electric vehicles throughout the entire country. I'll give Richard all the credit. I hope they all come their direction, because he sounds like he's ready for it. I'm not sure that we're actually totally ready for it.

So one of the things that we are doing -- I'm going to skip through a couple of these slides because we already talked about multi-family units and business commercial. You don't need that.

So what we're trying to do is kind of drive the discussion both internally within our own organization and with the cities that we have visited with. And I was telling somebody -- I guess it was the Commissioner. I was telling the Commissioner this morning that I have actually personally visited over 51 of our cities over the last 90 days. So I'm really out engaged with our communities and trying to get to understand where they are in their thought process. And I have to tell you for the most part, most cities are just beginning to grow up and be aware that this is going to happen. So trying to

create a sense of urgency is as just as important as anything else we're doing. So we're trying to understand to try to drive the discussion.

What is the actual PETV versus BEV mix going to be? Richard talked about 50/50. I show in here 70/30 mix. But when you start thinking about those mixes, they make a dramatic difference as to what's going to happen. When you think about the infrastructure, we talk about range anxiety. Does it really last? Is it really range anxiety? Does it last a week or is it six months? We need to know that, and new market entrants. Are they going to truly have range anxiety? Or when they have conversation with their friends, is that already gone before they buy the vehicle? So those are real questions we need to determine.

And what percentage of owners will plug-in even if the electricity costs more in a public application? So we need to think about that a little bit.

So we've been driving some assumptions to create a discussion. We're basically saying that the PHEVs would have 70 percent of the market by 2015 and growing versus the 50/50. Seventy percent of the BEV owners will likely use every opportunity to plug-in and recharge due to travel patterns and mitigate range anxiety. So that's a lot of people looking for a place to charge.

Plug-in hybrid electric vehicles, even though they don't need to plug-in, we think they will. We think at a minimum for this discussion 20 percent of people that plug-in -- that have plug-in electric vehicles will plug-in at every opportunity. That's significant because if you're driving battery electric vehicle and need to plug if but your buddy has a plug-in hybrid, he has that space, you may not have access to that.

It's especially important for workplace charging when you're trying to figure out for your employees how many chargers are you going to need for your employers and what mix are they going to have because those employees are going to arrive in the morning at 8:00. They're going to plug-in. They're not going to move that car again.

So if you have both PHEV owners pluging in and BEV owners plugging in, you may need more chargers than you think. Or you may have to create a policy that says if you're a plug-in hybrid electric vehicle owners, you don't get to plug-in at work. What kind of consternation is that going to create? So those are the kind of debates we're beginning to think about and trying to understand.

So continuous assumptions. Appointment of public fast charging stations will provide a level of security. I agree with the discussions about DC fast charging and we're looking forward to the day this is going to be

developed from the Ecotality installations and the work we've all been talking to Anegawa San about the TEMCO operation to try to understand what that means and try to incorporate that data into our regional planning effort as well. A lot of local public charging will be done for topping off.

When you start talking to your commercial entities -- just to give you an idea of some of the discussions you need to have. In some of the commercial entities, they talk about they're going to put charges in front of the store. So I can the question, well, how long does a person stay in your store? Oh, well, 25 minutes. Well, that's interesting. How far do they typically drive to your store? They know exactly how far they drive. They drive six miles, because they space their storage around the community based upon that known travel patterns. Well, after they buy something at your store, where do they go? They go home, because they have electronic systems. They don't want to leave them in the car. They get stolen or get too hot. So they go home. Or they're at a grocery store, oh, I go home because I don't want groceries to spoil. So wait a minute. You're only going to be there for 25 minutes. You're only traveling six miles. How much charge do you really need to have in front of that store?

And the other question is another example at Manhattan Beach, I was talking to the mayor of Manhattan Beach and he says we're building new parking system in our at the Manhattan Beach mall. That's nice. How many charges are you going to put? We're going to put a bunch. Well, why do you need a bunch? He says, well, we got to service all the people that come to the mall. I said, nobody goes to the mall if you live in Manhattan Beach. The whole city is three square miles. So how many charges do you really need at the Manhattan Beach mall? You do need a couple of charges for emergencies. So you need to start thinking about that kind of thing.

So we're talking about a single charge point that's expected to cover an average of two vehicles per day. That's assuming that if some commercial application people coming and going versus at the workplace they can stay there all day. Charging cycles have an average of 2.5 charge locations per day. So they have a charge site. So what does that all add up to? So if you take 100,000 vehicles -- and I show this slide to try to get you to understand the level of effort and complexity we're dealing with. Also how much money these people are making, these chargers are going to make.

There's -- if you take 100,000 plug-in electric vehicles, if 70 percent of them require external charging,

that's 21,000 battery electric vehicles looking for a place to charge.

If you have 20 percent of plug-in hybrids are 70 percent of those, you have 20 percent of those require charging that's 14,000 PHEV's looking for a place to charge.

Combine those together, that's 35,000 cars looking for a place to charge, meaning we need 17,500 charge points, meaning we need 7,000 charge locations to support every 100,000 cars.

Is that right or is that wrong? If you buy into that number, we would have a significant amount of charges. But is that the correct amount or not, especially based upon investment.

So we're making some recommendations. We need to review actual battery electric vehicle driving habits past current demonstration. Tom Turrentine and I were talking about the data that's going to come out of the Ecotality project. That data is so important we're all going to be beating on Jim Frankfort's office door saying give me the data. I need accurate readable usable data and I need all of it. Not just bits and pieces of it, because I need every bit of information we can to make those decisions.

We need to understand that range anxiety we talk about. Is there a magic number? We need to track

accurately the driving patterns of the initial market entrants that Ecotality is dealing with BMW Mini E project. We need to know exactly how their charge patterns are. We need to do some very careful regional planning where we look really closely at travel generators, travel patterns. We need to know where the industrial locations are and how many people and the distance workers commute to get to those industrial locations using my example of the travel generators, travel pattern.

If you go to -- again, pick on Manhattan Beach. People come from six counties to go to our peer. We need a significant number of charges at that peer. The little town next door to us, El Segundo, is a marvelous little town. It has great storage, great shops. Nobody goes there except the people that live there. So people in El Segundo need to have maybe one or two backup chargers, whereas the peer in Manhattan Beach may need a number of them. So we need to understand that and go forward.

Many believe workplace charging is critical. But what is the willingness of workplaces, large employers to provide that access? What is the typical travel distance for that employer? How are you going to manage that?

Just to give you an example of our small little company, 43,000 employees. There's over 34 locations that

have more than 100 employees. So do we put chargers in each of those locations? How many chargers do we put in there? Do we only do it at headquarters? What about those seven employees that work in Bishop? Don't they deserve a charger as well? So what is the policy we're going to think about as we drive that?

So we're beginning to do a tremendous amount of education, outreach to our business customers and we have like 13,000 assigned to count. That means they use more than a thousand megawatts a year. And every one of those is going to ask the question how many charges we need to have and then develop a review of fast charging system there, potential impact. I think as we've heard earlier they're going to make a significant difference both in potential number of public infrastructures as well as the cost to the consumer. So that's a really brief overview.

My last point would be we're using the data to educate our cities, educate our business customers, and make our own internal decisions as what we can do with our own workplace. So the data we all talked about today, it's critically important that it be open and shared and we often use in our regional planning.

COMMMISSIONER EGGERT: Thank you very much, Bob.

And next up we have Tony Markel with National Renewable Energy Lab. And welcome, Tony.

MR. MARKEL. Thank you, Commissioner.

I'll make my comments really brief just to keep us moving along.

I think the most important thing to really parlay is that the Department of Energy and the Clean Cities Program is really been in a driving mode trying to help fleets, municipal fleets, federal fleets, corporate fleets really try to start to use some of the early technologies and HEVs being the case and natural gas vehicles in the past and so on. Remember that as we move forward in the plug-in and electric vehicle technologies, these fleets are also going to be under pressure to try to adopt the technologies and they may end up in some cases putting a burden on some of the public infrastructure we're talking about. Those entities will probably have to invest in their own infrastructure and facilities. But those vehicles leave the fleets. They move out into the public community, and they're going to want to use that infrastructure and that's a consumer experience that comes back and we've heard already that the consumer experience is really going to be a key message that has to come across.

One of the other pieces that we talked about was the PHEV versus BEV ratio. Obviously, the federal incentives today are going to drive a lot of what

consumers decide on. Their understanding of their driving profile and how they use their vehicle and the range of operation that they want from their vehicle, will accept from their vehicle will drive their purchasing decision.

And then in the end when the incentives go away, obviously we need to know what infrastructure gives them the confidence that they can actually go where they need to go with those vehicles and those infrastructure plan we're talking about will definitely fit with that.

In terms of the financial landscape today, it's a really tough scenario to talk about how PHEV and BEVs survive in a true market economy without the incentives. So we need to be thinking that long term, not just these two years while we have all the federal incentives but what happens after that.

And then the last piece I'll mention a colleague, Richard Scholer at Ford, he's done an awesome job of trying to wrap some numbers around the this equation of how many BEVs, how many PHEVs, what kind of infrastructure those vehicles need. Certainly fast and always remember to balance needs versus wants versus wishes. These are what those vehicles really end up requiring a lot of vehicles will be supplied by what they did at the residential in structure. And we also heard about the fast charging infrastructure being something that visually

gives people confidence to be able to use their vehicles in full. So just a few comments just to get things going. But that's all I have.

COMMMISSIONER EGGERT: Thank you very much.

Actually, we do have one additional presentation for this or leading into the next session from Joel Pointon I believe. Is Joel here? Yep. There he is. Joel is with the San Diego Gas and Electric Company and will also be joining the panel. Actually, I think maybe in the interest of time, while Joel is giving his presentation, I'm going to ask the participants of the panel to come up and take a seat here at the table: Russell Vare, Alex Keros, Donald Karner, Bob Hayden, Bob Graham, and then also Dan Davids.

And then the moderators, Peter Ward and Leslie Baroody. And then we can go right into the panel. So go ahead, Joel.

MR. POINTON: Thank you.

This morning I just wanted to talk briefly about one of the major concerns that we have in dealing with the roll out, especially in the residential arena. And that is that of multi-units dwellings. And I use a different term than most do because the connotation of multi-dwelling unit seems to indicate a single building with multiple units. And we really think the spectrum is

much broader than that. In multi unit dwellings, we have everything that would encompass from trailer parks to townhouse, condominiums, to retirement communities, gated communities, luxury condominiums. There is a very broad spectrum there.

And I just want to touch upon how unique and diverse the housing and metering spectrum is that we're encountering, the critical importance of education and outreach and that's especially true for the utilities in dealing with these scenarios. Process, identification, and improvement and the identification of the challenges and solutions, and I'll offer you all an opportunity to provide us with some feedback on that and the identification of the priorities and next steps.

Here we have a scenario that may be typical. You see an individual may live in the upper right-hand corner, the meter that represents that living unit may be in the front of that building. And their parking may be at a remote distance from that building. That provides a fairly complex scenario in order to be addressed.

Going on to some of the other elements, you can see in some of these high rise locations that just the metering configuration that we're doing with and the tight spaces, the fact that we may have literally a conduit that was put in place back in the 60s that has no more space

for putting any additional wiring into these conduits really provides us with some significant challenges.

When we're looking at the density of housing, high density of housing gives us a high complexity of configurations. There may be a low availability for secured parking. We're finding many of these units do not have assigned parking. Setting a precedence for assigned parking for people with charging needs really creates disruption within these communities. The diversity of charging solutions needs to be high for these high dense configuration. And you can see going across or low density we have the same sort of parallels going on.

So some of the key elements legalities, the codes, the covenants, the restrictions for communities, these agreements between property owners and residents that exist, they need to be modified in many ways to allow for the types of changes that can accommodate these multi unit dwellings. This situation of those agreements between the property owners and renters also have to be evaluated. The metering and wiring the restrictive facility configuration some master metered remote parking scenario we looked at earlier.

Alternative location schemes, identification what can be done with common areas and the use of those common areas.

Cost allocation to residents, this is a really big issue in the multi unit dwellings I visited on site and meetings with HOA boards. This is one of the big issues that they have in trying to come up with an equitable system for all of their residents and the fee structures to go with that.

Education and outreach, we've been doing a variety of programs. Town hall site meetings with multi unit homeowners association and property owners, very important to listen to the ideas and the very specific and very creative solutions that these people are coming up with. We first need to provide them with the appropriate vocabulary and the appropriate orientation as to what the spectrum is out there. And once they have that, they can participate actively in identifying these ideas and solutions to solve these issues.

What I just referred to explaining the PEV world, especially our abbreviations and our nomenclature and just trying to get people to understands Level 1, Level 2 and DC fast charging distinctions involved there.

PEV data and solution sharing facilitating a network of multi unit interest groups and site available resources. Next month at the L.A. Auto Show, the EDTA's national electronic trick drive transportation association it's called NPVI will be released. That will be a

national resource that can be utilized. You'll be able to plug-in your ZIP code. You'll be able to get your utility. Find out if they have EV TOU rates. You'll be able to look up vehicles and their specifications, do side by side comparisons. You'll be able to look up the specifications for the spectrum of EDSE infrastructure going out there.

EPRI tells us last month there were more than 46 companies now in the market for EVSEs. There's a lot to keep up with here.

This is a project that we worked on with EPRI and it was combination Monica Moriarty is in the room. We had worked on this together. She's with SMUD. And we worked together in putting together this as the basic profile of basic flow chart of the stakeholders and what occurs, the type of handoffs and decisions that have to be made from the concept of wanting to have infrastructure to when the tenant or the resident can finally connect with that infrastructure. And you can see there's some challenges here in the amount of communication and the amounts of coordination that has to occur here.

I'm going to skip this one. Goes through -- we'll get into this on the panel.

But I do want to point out to you we do have on the bottom of this screen you'll see there is an e-mail

address there. I have been presenting this at all of the national conferences. I've presented at -- we're asking people to submit the challenges they're encountering in this particular field with multi unit dwellings. Also the success stories that they're encountering with these. And we're going to try to consolidate these and continue with our own outreach to put this together as a resource that can be shared with others, because we are finding that the challenges are community specific and unique and that the spectrum of solutions has to be broadened.

Thank you.

COMMISSIONER EGGERT: All right. Thank you very much, Joel.

I think one of the themes that I hear occurring is the idea of the need to share data and information on both the challenges and the solutions. So hopefully we will hear more about that during the panels.

I think now I'm going to turn it over to Mr. Peter Ward and Ms. Leslie Baroody to moderate the residential charging panel.

MS. BAROODY: Thank you, Commissioner Eggert.

So just the format for this time will be a Q and A and we'll encourage discussion. I don't think that there are any more Power Point presentations from this group. So we'll just get started.

Also before we start, I just want to acknowledge Pat Perez in the audience. He's the relatively new Deputy Director for Fields and Transportation and also Jim McKinney, who's the Office Manager for Emerging Fields and Technology. So thank you.

MR. WARD: Thank you, all. This is on, right?

In this section we're going to discuss the residential charging opportunity and this is one I think we're all in unison we'd like to see most of the charging occur there if we can. It can't all be there. But we'd like to hear from all of you. We have OEMs. We have infrastructure providers as well and utility representation on this panel. Or maybe if you want to go one by one in the how you view the residential charging and its importance in the configuration of all the different charging opportunity. We're pending to see the way from the Energy Commission because we do have responsibilities for siting new power plants. Like to see fewer peaker power plants sited in the future. And we'd like to see if most of this charging can be accomplished off peak and not have a disruption to the grid.

So maybe if we can go just in order I think might be best to give initial reflection on how you expressed the importance of residential charging and how we can capture most of that charging in that sector.

Joel.

MR. POINTON: The successful implementation of home charging residential charging is going to be key to the success for plug-in electronic trick vehicles and key to the success for the integration of the grid with these vehicles off peak charging is best accommodated at home. Our estimates are 80 to 90 percent of that charging that is essential for commuters is going to occur at home. Making that process easy, making that process functional for the consumer and making sure it is well integrated with the utilities is going to be an absolute necessity for the success of these vehicles. We've seen some very aggressive prediction as to where these vehicles may end up in 10 to 15 years. I would love to see that happen. It will never happen unless we are prepared to deal effectively with residential charging infrastructure in its implementation.

MR. WARD: Quickly, I've become familiar with what SDG&E is doing in their one 24-hour permitting opportunities in San Diego and working with Ecotality especially.

MR. POINTON: Presently, we're working with the International Code Councils in the San Diego region. And through the Ecotality project, Ecotality is working with training programs for installers as well as they'll be

training and orientation programs for the inspectors as well.

There's presently a discussion with NREL and also with the Ready, Set, Charge Program about using a national permit template that has been developed and using a web based beta test in San Diego. We're in the very early stages now of discussing that with the city of San Diego. But they've indicated their willingness to investigate this further. And going forward, it would give the ability for both tracking as well as quick permit turn around for that sort of system. And we're hoping that if it proves to have some legislation to it it might be something that could be expanded nationally.

MR. HAYDEN: Bob Hayden, city of San Francisco.

Many of the points that I ultimately want to make have been touched upon. But let me just real quickly identify what I think are some of the key points relative to residential. And obviously like everybody else here, residentials are first priority in terms of off peak charging is first priority and the presumption is most of that will be residential. So we all are looking for ways to make that happen.

But I think that the main points to emphasize on making the residential charging happen as we want it to are has to start with information. We need to have means

of getting information both to consumers so they understand the types of what the vocabulary is as Joel was pointing out earlier and what their choice are going to be.

But right now, most people thinking about purchasing a plug-in vehicle aren't thinking about the fact they need to put a charger in. So we need to have a lot of education with the consumers, and we need to have education with the permit inspection officials to make sure there aren't surprises for them in store.

What I'm finding is that working with the inspection and the permit offices certainly in San Francisco, they're pretty much up to speed. They know as long as they know what's coming, they have a chance to think about it in advance, be aware of what types of products are out there and how it fits with their operations, that's how you smooth away the problems, so they're not taken by surprise. So we need information systems out to those officials in other jurisdictions.

The part of that information process needs to lead to as another very key point encouraging purchasers of the vehicles to do their assessment of their homes for their electrical capacities early on. Get that done right up front before they even buy the vehicle. That could have some significant bearing on what type of vehicle they

buy and/or whether they can do a vehicle now and might think about it later. In San Francisco, we have an awful lot of housing that has not much capacity on their old electrical panels. And people should know that before they buy the vehicle.

I also want to just make a quick reference to time of use charging, which of course is a primary way for encouraging people to charge off peak, whether it's residential or anywhere else. Certainly in the residential application of time of use charging we just need to make sure we make it easy and not very expensive for people to take advantage of that. I know we're getting into lots of debates and questions about from the regulatory standpoint whether it be separate meters, dual meters, all of that. Whatever the answer is, we need to keep to consumer in mind to make sure that for a homeowner it doesn't get too complicated or too expensive to take advantage of the TOU.

And finally, I want to emphasize very, very highly that for cities like San Francisco, there is a very direct intersection between residential charging and public charging. It's been mentioned before. Richard Schorske, for instance, talked about it. But this is a key issue that we need to provide in the public space, whether it's public municipally owned or publicly

available commercial space. We're going to have to find places where a lot of these garage-less car owners have an opportunity to charge overnight. And we're looking for lots of different ways of addressing that. But certainly we need help from state government in funding some of those activities and making that happen.

MR. WARD: I was just thinking, I think if there is acid test for the home charging in a particular area, it might be San Francisco, you have a lot of challenges with the multi family dwellings. And you may not have a garage if you have a single family residences. I think that's a space that we are going to pay particular attention and could have meaningful foreboding or obviously success stories. For other metropolitan areas, because I think theirs is particularly troublesome if that regard. But you've been at this a while, so I'd like to see what you have to say about that.

MR. HAYDEN: Well, let's say challenging, not troublesome. And the main thing is that I would look forward to partnering with the Energy Commission on doing that anyway we can attack those questions. But being able to make sure we have -- we are trying out all of the ways of getting efficiently or fairly easily chargers into the multi-family buildings, multi-dwellings units, all of the issues that Joel so well pointed out existed in every

city.

But we have it in spades obviously in San Francisco. Seventy percent of the residents I believe do not own their on homes. So it's a combination of condos, apartments, and rentals and single family houses. And many of the single family houses that are rental are row houses that don't have garages.

So we are looking at ways that we can partner with building owners, with homeowner associations. We'll be identifying various projects, various facilities throughout the city where we can do some pilot projects over the next year. But it's going to take some time. And those are not going to be the facilities that are going to be equipped for this first wave of commercialization. But I'd like to make sure we have it done as soon as possible.

We're also looking at curbside charging along streets. But there is a host of complications there. And we will -- I won't get into the details now. We can talk about it late EVSE infrastructure we'd like. But we are looking for some pilot applications of curbside charging in the city as well. So that's another area we can work with you.

MR. WARD: It's good to have a reference such as yourself handling these particularly thorny problems that

will come up in San Francisco, because as I say, we'll be a model for other metropolitan models in the state. And we'll see if we can help you with that in some --

MR. HAYDEN: Thank you. I have to point to San Diego too and all the work that Joel's doing in all of these questions as well.

MR. BRIRETY: Okay. Alex.

MR. KEROS: Thanks.

I actually -- you know, I think you said it well, Peter. The residential is certainly high on the priority list of pretty much probably everybody in this room. But I'll rephrase it a different way, which it is the most critical path to get right. And if we think about it sort of a little bit more broadly, this is in many ways going to be the customer's first experience with charging. And if processes are misunderstood, complex and we can't help navigate the customer through it, what we're going to find is we're going to be trying to correct the home charging installation process more so than focusing on all the good data that we've been talking about on how to place public workplace in those sort of things.

I'll use the word home more broad. I actually agree with Bob and Joel and I'm sure everybody here. Home is where the heart is. And a home is not simply a house sitting with an attached garage in the middle of suburbia.

This is really more broadly in how we're going to focus in on how to establish that process.

I think we've all done very good to date taking the learning from previous programs. I think we have all been communicating widely. We need to keep communicating between utilities, OEMs, EVSPs how the process integrate with one another.

Frankly speaking, learning is already telling us customers are getting confused even with the talking, even with the explanation. We really have to walk through this step. Why is an assessment so important? Why is a range analysis before uncontested all subsidies before an electrician walks into our house so important?

So it is partly an education and outreach. It's to the customer. It's to the electricians. It's to regulatory parties. It's to everybody who has their hand in that chart you put up, Joel which is we're talking 15, 16 steps that we sort of need to get one. And if we boggle one of those, the customer is going to call us out on that one boggle. So really when it comes down to what GM's focus is is really getting that residential -- that home installation done right where we can turn around and number one have a safe place to charge. We know the car is there most of the time. It's likely going to create the most electric miles on the road and how do we balance

it moving forward.

So it's got to be easy. It's got to work. We have to more importantly create a system that the customer can then easily translate to their friends and say, hey, this is possible. So our best outreach is going to be those customers. So really for us is focusing in on how to make sure that this installation process is easily understood by the customer, the choices are being made, people are there right away to be to answer their questions. And as I said earlier, the information that we're translating is consistent, that we're not seeing different pieces.

So that's really the focus on residential. It's how GM sees it and we'll continue to support the dialogue around it.

MR. WARD: I'm sure that GM is doing studies on regarding how your pick off point, which is an enhanced range of the vehicle differs from total reliance upon electricity. And you probably have a little bit of a nuance to that, and I'd like to hear if you have that some of that data, go through it here. But if you do, I'd like to see if you can acknowledge that. If that's publicly available, we're wrestling with that issue coming up with creative solution across the state based upon lots of efforts that have been regionally planned for years. We'd

like to hear your take on that, because yours is a little bit less strategically key charging for your vehicle.

MR. KEROS: Agreed. The good news as we're going to learn along the way. The bad news is that's played a little bit of a roll and people have a good idea of sort of the range anxiety and those sorts of things with a plug-in type hybrid or the EREV like the Volt is, there's going to be a little bit of learning on how do customers want to maximize their EV mode?

Our understanding and our sense where it's going is, for example, Level 1 versus Level 2. We believe a lot of customers might get confused by this process that we're talking about and say, you know, what, heck with it. I'll bring it home. I'll plug it into my 120 socket and see if it works for me.

We think there is going to be a substantial number of customers. But we also think a lot of people will try to take advantage of 240. Their really early adopters are going to be buying these vehicles in part to drive it in electric mode. The great part of the Volt is the fact it can be every car to these folks and it can drive L.A. to San Francisco without any worries of charging. But they still are buying it because it's an electric vehicle and they can take full advantage of it. So we don't have empirical data, but we are keeping a very

close eye on this balance of Level 1 to Level 2 and how it's going to play into the roll.

The beauty of it is we've created a solution to range anxiety. That's the honest truth. That's GM's product offering specifically tackled that issue by being an EREV. So there's going to be a little bit of learn I think specifically at how EV owners use their vehicle. Do they take advantage of it being pure electric? We think so. But the data will sort of prove it out in the coming months.

So a little loose to answer the question. Appreciate it. There is some market data that we suggest that the balance between Level 2 and Level 1 will be closer than anticipated. But really the customer is going to decide when picking these vehicles.

Caveat, early on, a lot of DOE programs, a lot of CEC programs are incentivizing Level 2. I suspect their customers will want to take advantage of it.

So the true data will sort of fall outside of those incentives that the customers can take advantage.

MR. WARD: And I know you're going to be on a panel later on regarding the other opportunities for charging and like to hear how they measure up with the EVs because the opportunity charging may not be as prominent for you folks for your customers.

MR. KEROS: Absolutely.

MR. WARD: Donald from Ecotality.

MR. KARNER: I'd like to address this discussion of commercial versus residential charging, because I agree with everything everyone said about residential charging and its importance. But I think it's important to keep in mind it's not an either/or. You need both. Yes, residential charging is important.

It happens to be the alligator that's got us by the backside today, because it's the first thing we're encountering. But commercial charging is going to be equally important as time goes on. And I think the common thread between those two goes back to the smart charging concept. And the fact here we have for the first time a real opportunity to implement smart grid concepts, including battery energy storage and make that an asset to the grid. So from our perspective, installing a single dump charger is a crime, because at some point in time we will wish we had control of that from a grid standpoint and an energy standpoint.

Whether that's a Level 1 or Level 2 charger really doesn't matter. We need to be focused on the long-term benefits of having smart charging, whether it's in the home or whether it's at the store or at the workplace.

We talked about residential charging being equivalent to off peak charging and it's not. I get home at 5:30 and plug my vehicle in. From a grid standpoint, I do not want it to start to charge that. So without some kind of compensation for a dump charger, home charging is going to be on peak charging and if you're going to make that compensates, why not go to the full level of making it a smart charger? We can do economic dispatch. We can do renewables dispatch. We can do demand response and integrate all these chargers into a system that really is a tool to the electric utilities and to their system planners. Not a problem they have to deal with.

This is the first time we have had the ability to dispatch load and have that be fairly transparent to the user, because we have good energy storage. We're not talking about bumping a thermostat a couple three degrees and making people sweat and angry because they know they're being demand responded. We're talking about being able to shift charging with a time available, still meeting their objectives for when they need their vehicle and what state of charge they need it in and essentially being transparent to them, using energy use around, moving demand around to suit the needs of the grid at that particular time, not deciding between 9:00 p.m. and 9:00 a.m. is the best time to charge vehicles, but really

looking at today, what's the situation almost effectively real time rates and certainly real time control.

So I think we need to elevate the discussion of residential versus commercial beyond just that and looking at what do we want from the electric vehicle infrastructure. What is it capable of? What's the true potential there to support the energy goals of California and the United States and the electric utilities that are supplying the electric energy in those areas.

MR. WARD: I think you've raised some very good points. It is much more complex than just saying residential charging off peak. It's certainly much more than that. And it's more important, but it's also more complex because it could be more useful to us in the long run if we do it right, right from the start as you mentioned the smart chargers. I think and the smart grid are going to be key to that. So I hope we can get --

MR. KARNER: And laying the ground work, everything from permitting to rate design. And everything in between are things that need to be dealt with. Some in a very short term. Some in the longer term.

But I think as long as we have that long term focus as to where we really want to go, the diversions will be kept small and will head towards that longer term objective. We need to be careful not to get off on a side

tangent, because we're looking at some specific issue that at the time seems like it may be a huge issue. And the EV project every day we face an issue that we think today is back breaking, because we're kind of the point of the spear. We're deploying a lot of infrastructure in a lot of different areas and it is uncovering all of the sore spots, all of the issues associated with that. And if we slowed down and we dealt in totality with each of those problems, we would never get anything installed.

So you know, we try to keep a very long-term focus on where we need to be, our data collection goals, our goals of sharing data with folks to help them understand how to craft their long term objectives as well, yet deal with problems and try to provide the opportunity to ultimately solve them in the long term.

MR. WARD: Thank you for your vision.

And I think many localities around the state are going to be experiencing your pain vicariously because your example as set will help set standards in their areas, because you raised a hosted of issues that are encapsulated in your vision. I think that's really important to bring out. And as you say share that information with other localities. I think they will benefit from your experience, if that helps.

MR. KARNER: Yeah.

MR. WARD: Dan Davids.

MR. DAVIDS: Hi. Dan Davids with Plug-in American. I'm filling in for Enid Joffe of Clean Fuels Connection. And she and I share -- we feel like we finish each other's sentences when looking out for the consumer point of view on these things.

I'll just mention that I'm joined today by my colleague Marc Geller, who drove a RAV 4 EV from San Francisco, and it's charging in the parking garage across the street. Probably in another half an hour it will be full and ready to take him back. So there is a good example of destination charging and of course all the rest of his charging at large part is at home in his residence in San Francisco, as is mine.

My RAV 4 EV is in Seattle. This last week, I hosted a block party with four Chevy Volts at my home in near Seattle and was able to actually charge two Volts at the same time from one charging station using my charge point card here. And we think that was kind of a first. And it's just an historic point in time for all of us. It's really quite exciting.

And six weeks ago, I was with Russell in Honolulu driving the Nissan Leaf. And they're both great vehicle. Plug-in American doesn't pick winners or losers. We want the Chevy Volt to have as much of a chance in the

marketplace as much as the pure EVs and the other plug-in hybrids.

Just looking at the strawman of things to talk about in this section, say a couple of things, as far as where to put the charging stations, our initial response is to put them where they're parked the most. And clearly they spend most of the time parked at home. The other place they're parked would be workplaces. So in essence, I'm supporting the pyramid we've all seen recently put forth by Mark (inaudible) of EPRI, which has the large base at the bottom being residential, then some workplace and much smaller public portion at the top.

I've come to think of the residential charging always looking for different ways to look at it and the latest way I've been looking at it is I'm in a similar situation with mine in Seattle with Richard Lowenthal of Coulumb in that his charger for his Mini E is at his business and my charger for my RAV 4 is at my business. So it's really at the other end of my commute. So I'm actually looking at that and thinking that's not so much workplace charging as it is commute charging. It's just happens to be located at the other end of the commute. So I still think there are other ways to look at this.

On multi dwelling units, I just wanted to commend Joel and the work being done in San Diego that as just

phenomenal what you're doing and just mention in Honolulu they just -- it went into effect July 1st. I call it kind of a charging rights law over there where they've addressed all of the barriers that homeowners associations were putting up preventing people from installing charging in their residential condominiums.

And lastly, I'll just mention having to do with public works guidelines and permitting and local planning the work done which Plug-in American was a consultant on with the Puget Sound Council in Washington where we created the first model ordinance recommendations and guidelines for cities in Washington, but to be used anywhere across the country trying to I guess address all the issues that have been brought up today, including ADA accessibility, signage, streamline permitting, zoning, data collection to extent, all these issues. So that report is available at psrc.org, Puget Sound Regional Council. I understand there's work being done in California already to try and do similar work.

MR. WARD: Yes, we have heard of the Puget Sound example, and I think we're trying to take examples from lots of different regional planning.

And I want to say how good of you to go to Hawaii to be on the cutting edge. This is really quite a sacrifice for you and we appreciate you bringing that

information back. I'm happy you were able to come to California as well.

MR. DAVIDS: It's a tough duty.

I also want to mention I charge with time of use rates. I have another RAV in Hawaii and the PUC over there also just passed specific EV rates which went into effect a couple of weeks ago. So we're in the process right there of switching my programming. Nothing has to change, except the programming to switch it over to EV rates.

MR. WARD: So it's a smart meter, smart grid here?

MR. DAVIDS: Just a meter that keeps track of time of day and applies different rates during the day.

MR. WARD: Well, from that regional planning approach I'd like to call Bob Graham, who has a wide service territory, but who has a lot of regional planning going on. We want to acknowledge because I think a lot of this has been going on for quite a while. And in California, I think we are kind of ahead of the game because of the experience we've had with EVs in the past and has set up regional coalitions that has been doing a lot of the planning work overtime. So Bob.

MR. GRAHAM: Peter, thank you. And it's helpful to be at the end of the table because I can be shorter

than others. I'm going to focus on the issues that are impacting utility, kind of stay focused in that area and what we are concerned about. We are not concerned about 120 chargers. That's really not an issue with pretty much any place in our distribution system. We aren't concerned about 2240 40 amp charging systems, especially the circuit that would be around the coastal areas where the homes do not have air conditioning.

So that drives us to work closely with the EVSE providers and the autos to begin to ask questions about how quickly we can get notified as to where those vehicles are actually going to go.

It isn't just trying to understand the first vehicle. It's also trying to predict how many vehicles will follow that vehicle in a neighborhood because it's extremely important for us to be able to not just go upgrade to transformers necessary but also do we need to just double the transformer or quadruple the size of it. What are the key issues of that and do we need to do it. It's extremely expensive for us to upgrade systems on an emergency basis. So we don't want to do that if we can help it.

The education outreach we've harped on at length with one addition that I will add, and that is the importance of having that education reach all the way down

into the bowels of a city to make sure that the inspectors, the permit offices, they get that education as well. One of the actions we're taking with our visits is to understand what specific issues are raised by individual inspectors and try to develop what those issues are in responding and providing those on our website.

But at the same time, we need to reach in the bowels of the utility and understand where the relationship between utility planner is with those cities and the inspectors and the electricians so we ensure that the utility itself is meeting its obligation of being as streamlined as we are, as we ask the cities to be. So it's truly totally end to end process.

I get very upset when people talk about permitting and inspection as being issues when it really is the entire end to end process and it's just not permitting. In fact, most cities do same day over-the-counter permitting. Most do next-day inspections. I find very few that don't. Unless there is some complexity. But we need to keep doing that.

Another point again on utility side is when we talk about off peak, off peak is also in the morning. So that fits with your workplace. We're very comfortable with people charging from 8:00 in the morning to 12:00 in the afternoon. So go to work and plug-in. We're very

comfortable with that.

We, too, were thinking about the metering and communication that addition talked about. That effort is very important. It's also everybody needs to be aware of the difficulties of communicating with a utility back office system and the things -- little things like can we use the meters on an EVSE to report energy flow. The answer is yes, but does it meet revenue grade metering requirements and how do we communicate between utilities and the EVSEs to do that. We are all working together with the various EVSEs. We have a team of people on the technical side that are communicating with all the EVSE suppliers on their technical teams the talk about communication, talk about metering. So we're worrying low carbon fuel standards. We're worrying about road taxes and that type of thing. We support the smart grid, the smart connect systems. We're putting 5,000 smart connect systems in every day in southern California. So we think that's an enabler. We do not think the smart grid -- you don't have to have a smart grid to have a PEV revolution. But it certainly enables it to be a better system and a better future. So I think I'll start there because I think we have up with more and we'll respond to other questions.

MR. WARD: Thank you.

Russell Vare from Nissan, the dedicated electric.

MR. VARE: Yeah, exactly. Thank you very much.

We find residential charging to be the most importance because of that. We have a 24 kilowatt hour battery that takes seven or eight hours to charge from empty onto Level 2 and 18 to 20 hours on a Level 1. So 240 Volt 40 and dedicated circuit for Level 2 system is recommended. We think it's going to be the most important for the best customer experience.

So what we've tried to do is a couple things. One is to educate and two is to simplify. So the customer buying process integrates environment as the preferred vendor for this home charging solution as a way to simplify this process so they can schedule their home assessment at that same process whether you're in Honolulu or whether you're in California that you could have a certified contractor come out, take a look at your certain set up and, you know, give you an evaluation of what's needed. Because that's part of the education process, because there is investment needed and for the customer to realize kind of what's required in order to have drive of full range of the car. And that's all done before the purchase of the vehicle, before delivery of the vehicle so the EVSE is set up, ready, working, and waiting to go for vehicle delivery so that the customer can drive it on day

one.

And in terms of -- so one of the things that we're trying to do from our side is make that a simple process from the customers. But what we need from our partners and a lot of the people in the room is help on some of these other issues like permitting. And as was mentioned it is looking really good in California, most jurisdictions are a one day permit and one or two day turnaround for the inspection. But that's not everyone. In some areas are going even better, like city of Los Angeles has an online permit. Some is something we want to strive for is making it even simpler. So we're not necessarily concerned, but we do want to do our best. We haven't actually seen a lot of these start yet. So keeping an eye on it and anything we can do to improve it is better -- the goal.

And just also to mention the off peak rates. As I mentioned in the presentation that the Leaf does have a charge timer so you can set automatic charge timing to take advantage of off peak rates. So we think that -- we think that's important and encourage pricing to encourage customers to do so.

MR. WARD: I must say I found Nissan and Ecotality and SDG&Es and all of the participants in your program be very response to the needs to make sure it's a

good experience for the customer. You're not allowing them to have a vehicle until they've done this, this, this and this. So when they get the vehicle it is more instant gratification. It would be the wrong message to have here's my car and I can't drive it because I can't charge it adequately and that sort of thing. I don't think we can start with a hybrid electric up in the development of this nascent market right now. So I think your company is to be commended in doing this and the best roll out way possible.

Do you want to go to questions?

MS. BAROODY: Karen Schkohnick from the Bay Area Air Quality Management District, she had something to add to this conversation in terms of street side charging. Do you want the talk to that right now? Maybe right in here. Thank you, Karen.

MS. SCHKOHNICK: Thank you. I'm Karen Schkohnick of the Bay Area Air Quality Management District. I just want to thank you for the opportunity to add some additional comments.

I think the panel has done a really good job of discussing all of the issues. I think from the air district's perspective what they're seeing is that this is really a new and emerging technology. It's been around obviously for a long time. But there is some really

significant advances that make it unique and yet we're still at the very beginning. So there is a lot of low hanging fruit opportunities. Home charging is clearly in home charging is going to be preferable for a lot of reasons, especially if it's networked or can be timed so that it takes advantage of off peak charging.

At the same time, there's going to be a lot of areas, San Francisco. I live in a building in San Francisco where there's several feet of concrete. Probably cost about 50,000 dollars to install charging in my building. So I don't think that's really an option for us.

At the same time, to have an EV I don't think it would make sense to plug-in for eight to twelve hours to try to charge my vehicle either. So home charging is going to be really fantastic and effective for those it's going to work for. At the same time, there's going to need to be corridor or workplace charging to accommodate folks that doesn't work for. And I think we really need to look for plethora or multitude of options and really further the low hanging fruit rather than try to pursue any one avenue or way of charging, because ultimately that will not really work for everybody and end up being kind of expensive.

So again, from the air district's perspective, we

try to clean the air. So we agree very much with Peter's comments earlier that this needs to be done without creating any new power plants. And the way that we do that is really going to be maximizing off peak charging usage and also renewable energy sources to help to ensure that we don't have any impacts to the grid. So thank you.

MS. BAROODY: We'll take questions now from any of you out there or on the WebEx.

Tim, come on up.

ADVISOR OLSON: Commissioner Boyd, I have a question. I guess I'd like to hear from Joel Pointon and Don Karner and any others that would like to respond.

And the comment is looking down the road here, we're very quickly going to be investing more money here at the Energy Commission and additional infrastructure. So we have 15 million dollars out there. You're doing some construction projects and we're going to see a continual wave of vehicles. So we're planning on additional funding. I guess a couple different parts of this question. At some point I imagine the Energy Commission is going to diminish its investment in infrastructure, because we just won't have enough to really address the growth. And I kind of raised it earlier is in the context of evolving business models. And there's kind of another thing out there and that's if

the Public Utilities Commission does not allow rate basing IOU investments, it's possible that public utilities might allow that. But if that doesn't happen, then this cost gets borne by the consumer. I'm guessing. I'm pretty sure you're not going to cover that yourself.

And I guess comment on how do you see that business model's evolving. In essence, what's going to be the cost of it to the homeowner for that installation? And if it's a smart meter attached to it, is this -- I mean, if a person is going to spend $33,000 to buy a car, is another two or 3,000 or whatever the cost, is that going to be a back breaker or will they just say I'm going to buy that anyway.

And I guess another thing I'd like to hear you comment on is as we're designing how to continue our incentives in this, does it make sense to do this through grants directly to the installers? Or particularly for homeowners, should we do this in a rebate fashion to the homeowners or like other states are doing tax credits, either business tax credits or residential tax credits.

In essence, we're looking at ways on how to minimize our workload, too. And if you have a comment, I'd like to hear it.

MR. POINTON: Do you want to go first?

MR. KARNER: Okay. Lots of things to talk about.

I guess I'll deal with your last issue first, and that is if you are going to do incentives, would you do that to the installer? Would you do it to the home owners?

You know, I guess in my view it's probably to the home owner. I think the most important thing to keep in mind from a very practical standpoint is if you say we'll reimburse the $1,000 for a residential install, it's amazing how every install is $1,000. It's just phenomenal. You know, if you're going to get your money's worth, you need to make sure it's done in a way that there's someone with an incentive to still keep the cost of the install to actual costs, because not every install is all that complicated. And the EV project, the ones we're doing, we have a 1200 dollar project for doing in stalls. And 80 percent of our installs are coming in below 1200 dollars on the estimate. And so you know, some of those are over and some of them are really significantly over.

But from experience, I can tell you that if there's no one that cares if it's less than 1200 dollars, it will always be 1200 dollars. So that sets the floor. So that's what you really want to be careful of with respect to your incentives.

The other issue that I'd like to address is just ownership in the business plan for charging. And we

really believe that government whether it's the CEC or the CPUC or whoever it is that's providing incentives should be at the leading edge of what's rolling out, knocking down barriers, providing incentives to reach beyond where the current situation is. So we would expect that initially it would be residential charging infrastructure, then rolling into commercial charging infrastructure and then rolling into other issues that tend to be barriers. I can think of some that this whole concept of how do we integrate with the grid, dealing with issues of tying into the grid and we're dealing with trying to deal with some now with sub metering.

But the utility back office and integration with that, there are a huge number of issues that are associated with making available to the utility this potential smart charging infrastructure. And I believe that that infrastructure needs to roll out in a private business kind of a fashion. It can roll out that way, we believe.

And part of what we hope with the EV project we'll be doing is demonstrating some different models for how that might roll out. As I said in my opening remarks, it's our belief that if all you're doing is providing charging energy, that it's difficult and more probably impossible to make a business out of that to where someone

that's a business owner or property owner is going to say I'm going to pay to install a charger and I'm going to offer charging services because the competition for that is not gasoline. The competition for that is home charging. It's that off peak rate at home. And if I'm going to charge away from home, I'm going to realize there is a difference. And what do I get for that? Is it convenience? Is it some other value that is yet to be defined?

As consumers, we're going to maximize our satisfaction and minimize our cost. And if it's the same kilowatt hour I'm getting away from home or at home, I'm going to go to the cheapest place, and that's going to be at home.

So it will be very difficult for charging away from home in commercial space to effectively have a business model. It is not impossible when you look at other value chains that you can ascribe to that charging. And that's a key focus of Ecotality with our Blink retail brand as well as demonstration of that through the EV project.

So helping with that, helping to roll that out, trying to knock down some of the barriers that exist with that. Everything from demand charges, which was addressed in one of the presentations -- I can't remember which

one -- to signage issues in commercial space are all things that will eventually impede the business development of this commercial charging. Residential charging is going to happen if somebody buys the vehicle, the first thing they buy the vehicle, the first time they buy the vehicle if they are a homeowner they're going to install a charger. The second time they're not going to have to worry about it installing a charger.

If it's an MDU, the property manager may install half a dozen chargers in six spaces right next to each other and charge an extra $150 to park in that location and cover the energy costs themselves. Those kinds of models will develop if there is a business reason for people to do that. If we encourage commercial charging, if we provide the opportunity for ascribing other value chains to charging. And those are the areas that I think with incentives it can help, because it's always that leading edge to leading edge that is difficult for people to venture out in and where the government incentives and the government help, whether it's economic incentives or just helping with removing barriers can be most vital.

MR. POINTON: You had used the word evolution as part of your description. And I think that's very accurate. And we have to remember that we don't have definitive answers at this point that we are in an

evolution process.

I think we're going to learn from all of the rebates and tax credits and everything else that have been offered so far. I do want to bring the people's attention that the $2,000 federal tax credit is due to expire December 31st. And you have not brought it to your legislator's attention, you may wish to bring it to their attention that we're just beginning this process, and yet that particular resource is going to dry up just at the point where it can actually have some impact in the United States.

I think going forward, we're going to see that there need to be various business models. There needs to be business models that sustain this charging infrastructure going forward. It has to be able to sustain itself going forward. They're going to be appropriate applications for rate basing of I think for looking at the rate base model as well, because we're going to have holes in this infrastructure. And we're going to have elements where it may not be as economically feasible. But if we're looking at quality of access to this infrastructure, it's going to need to be some sort of public aspect in providing that level of support.

I know that's one of the areas that SDG&E has looked at going forward. That we are concerned that there

may be holes in this infrastructure and they may not be totally equitable access profile when we see the evolution of this continue to move forward.

So I think the marketplace has a major role to play here in building a sustainable infrastructure base. But I also see that we're going to need multiple solutions here to address all aspects of this infrastructure.

MR. HAYDEN: One other aspect of the getting over the cost hurdle for this stalling some of these chargers in some of the more problematic challenging locations like MDUs and even individual homes where there's high cost while we're grappling with rebates and things of that nature. There was another avenue that we were starting to get ahold of and has evaporated. And if there's a way that we can all put our heads together to get back to and that's the pace financing program because that as those programs were rolling out in cities around of where, including California and specifically in the Bay Area, a number of jurisdictions, San Francisco and areas were planning on having EV charging in some situations be able to apply for that type of financing where it's attached to the long term repayment through the real estate taxes.

That's been put on hold. Whether we get back to it or not specifically, I don't know. But that approach could be re-explored again, working with the State, we can

find ways to get through that type of way of getting over some of the initial high installations costs or some of these more complicated location, that would be very useful.

MR. GRAHAM: If I can, Tim, you asked the question about where to spend the money. And I'm willing to suggest places to spend the money.

First and foremost, I do believe there needs to be some detailed regional planning built on what's been done recently in the Bay Area and others and that roll up into a statewide plan.

Second, you are moving down the path of upgrading the existing infrastructure. Let's make sure that happens and get it done. If you do that, there's certainly regional coverage across the entire state.

And finally, I think we need to do a really good job of identifying key travel destinations that are in the state today and figure out where those are and get the infrastructure, at least some infrastructure in those key travel destinations. And that data exists simply through all the transportation planning that has been done over the last number of years in transit. And then I'm going to push back a little bit on you, because we've talked about this before over the years. You talked about the potential of the state not providing additional funds or

reducing funding in the future. I think we need to take a completely different approach. I think we need to say what is the value proposition to the state that justifies additional funding not only in the near term but long term, a continuous funding base that supports electrification of all transportation, not just automotive transportation. And that means we do a very detailed look at the economic value to the community.

When you say 75 cents equivalence gallon per gasoline -- for electricity versus three dollars a gallon, that's a spendable income for individuals. That's money to the community. There's health benefits. There's some actual real value to us from health cost perspective. Jobs, exporting these technologies that these companies are developing here in the state. We need to figure out a way what the value of that is to make sure that they get the necessary resources.

And one final thing would be one simple example. There's significant cost reduction for the state's fleet if they go electric. And that's every single fleet in the state, whether it's a public transit fleet or Caltrans that receives funding from the state to support their fleet operation, there are significant cost reductions. Let's calculate what that cost reduction is and let's make sure we fund electric transportation so that the state and

itself other entities can take advantage of these technologies. So let's think differently about the State not providing funds in the future, but think more holistically about the State providing not only a minimal level of funding but a significant level of funding.

Thank you.

MS. BAROODY: Thank you, Bob.

I think we'll take one more from Dan and then we'll break for lunch.

MR. DAVIDS: Okay. Great.

On the home charging expense, when the consumer is (inaudible), I just want to emphasize that Plug-in America thinks we should not over-complicate this. Yes, there are homes that need service upgrade. But our experience has been that just like the solar installers who go out and do site evaluations before they put solar PV on someone's roof, those homeowners likely know about that already because that's the same thing that's been preventing them from putting in a hot tub or upgrading their HVAC or whatever.

But when you're looking at an awful lot of homes that have amp capacity, service panels already in their garage and there is a place for the circuit breaker, there's simply no way the installation should cost a $1,000 to put what is no more complicated than another

dryer outlet four to six feet away from your service panel.

On the cost of the chargers themselves at home, if they're just dump chargers, we certainly think those are going to become commodity pricing pretty quickly just due to competition. We're tracking over 36 EVSE manufacturers in this space. And even with the smart or networked stations, we believe strongly that the data standards should be open and that the price of those units then will come down quite a bit.

MS. BAROODY: Okay. I think that wraps up. I want to thank our panelists very much for your presentation and input. We'll reconvene at 1:30. Thank you very much.

(Thereupon a lunch recess was taken at 12:36 p.m.)

AFTERNOON SESSION

1:39 p.m.

MR. MARKEL: I think we got it on. Welcome, everybody. I'd like to get this panel started so we can get done in the time that we have. I believe we have until about 2:20 to cover this topic. The topic we're covering in this panel is workplace charging and how the companies and what our intentions are, what our strategies are to cover workplace charging.

I'll just make a couple comments as we get started in this, and I'll let our panelists make a few comments on it and open it up to questions.

One of the things that I know has been emphasized we've talked a lot about residential in the morning and that obviously is the place where people are going to get the majority of their charging, at least many people. I know there was a recent study in the last couple years General Motors worked on looking at some of the travel survey data, the NHTS data and highlighted how workplace charging is really that next big chunk of time where vehicles are parked. And so it ends up being a very important piece for giving people a pleasurable experience.

We also have infrastructure that is ready available in those locations, at least electrical

infrastructure that's delivered to commercial facilities, workplace facilities. And it potentially becomes a benefit to those employees.

So with that, I guess I want to open it up just give you guys a couple framing questions to think about as to where this fits in the spectrum of timing, when do we focus on workplace charging. How do we -- how do we educate, how do we set the framework up for employees so they give consistent experiences to employees, employers to employees as to how they might benefit from this resource that they're going to provide, and then how do employers actually pay for it. How do they recover their cost? How do they justify it in their bottom line? So I'll frame it with those questions and let the panelists talk a little bit.

First we have Bill Boyce from SMUD.

MR. BOYCE: Thanks, Tony.

Basically, with regards to SMUD, I'll give you an historical perspective. We have been active in the marketplace for 20 years and have installed a lot of workplace charging. At the time it was more or less considered public charging in the downtown parking garages in Sacramento. I think just about anybody that drives into town ends up using those. But in majority of those cases, at one point in time they were totally swamped over

by the State employees that happen to have electric vehicles driving down town.

What I think we found over time is workplace charging has almost become tailored to individual drivers. And all that really comes down to individual commute needs that everyone has. And in essence, you know, a lot of that really gets to be on a one-on-one basis what the individual employee. To trying to reach a global solution for everyone isn't necessarily the best when it gets down to that.

The other part I like to think about is it really does come down to the commute. Drivers become possessive of their charger if they don't get access to that charger every day, they usually get pretty upset, because that means they're probably not going to get a charge to get where they want to.

The other thing that we have seen, we anecdotally came up this morning. We have seen where there is a lot of workplace only charging where people charge up at work because it's free or doesn't cost them as munch, and vice versa, they don't charge at home.

One other thing I think has been interesting to see over time with the aging RAV 4 fleets, it's also becoming an important hedge gets battery degradation. As the batteries degrade over time, the range drops in the

vehicle, the need to get additional charging at the workplace is becoming more critical for quite a few drivers. And that's something we've seen more on a recent front.

You know, with regards to some of the other challenges, I think a lot of what's going on now, a lot of employers are more or less rolling out potential employee-based charging more for green labeling, how to be more environmentally friendly. The benefits to the employees, if you took something that really only charged at work 20 kilowatt hours a day, times the number of work days in the year, roughly you could get to anywhere to 700 to $1,000 a year type of value to the employee.

Also thinking about that, they might not have to capitalize a home charge unit. At work, if they have charging, guaranteed good parking places. So there's a lot of good benefits that could come out.

With regards to what it costs the employer, I think our historical average more for fleet and public EVSE installed was quite a bit around 63 to $6500 per question.

So kind of leaving that, what are some of the other things we've been struggling with is how does that really tie to the individual commute. In Sacramento, working with the local metropolitan planning, SACOG, the

average round distance commute to Sacramento is 15 miles. So you have to ask yourself how much workplace charging is really needed versus what gets tailored to individual commute patterns. And I think some of this -- the earlier sessions they're taking a look at does everybody have to have workplace charging at work or is it only for the person that literally is 50 percent beyond their range in order to get home. So really looking at specific versus what the real commute database as I think is some of the clues we're going to have to look at to make sure we don't over build infrastructure but also have enough to meet the needs of the people. And I'll just leave it at that.

MR. MARKEL: Thank you, Bill.

Dave from Sonoma County.

MR. HEAD: I'm Dave Head, and I'm the fleet manager for Sonoma County. And looking at the agenda today, it appears that I'm the token fleet guy on all the panels. So I have to speak for a lot of fleets.

One thing that makes fleets unique is that we're talking about residential charging, fleet charging, workplace charging, public charging. We do all of that. And I mean, literally, Sonoma County probably has 50 different office locations throughout the county. So essentially when I have a vehicle parked there, it's residential charging for my fleet. And looking at that,

our infrastructure development plans, we're laying that out to provide charging throughout the county to try to deal with range anxiety. To try to deal with all the issues that have been talked about so far today so that not only can my fleet move throughout the county without concern of range, but also the public can.

On the workplace charging side of it, we're trying to place all of our chargers. They can be what we call multi use. So at night in the off peak hour, my fleet is charging at those stations. But I don't want those vehicles parked there during the day. Those guys are supposed to be out in the field doing work. So they become available to employees or they become available to the public. And that's actually part of our deployment strategy in where we position EVSEs at county facilities. And plus we have an opportunity as being one of the largest property owners in the county to place charges in critical areas like fairgrounds and veterans halls. And those essentially are public charging, but they're in high use facilities. And they're also county vehicles based there. So we have to cover the whole gamut.

Some of the things we look at in new construction or remodeling, EVSEs help with your LEED certifications on your buildings. Our architect's office is excited about that. It's a small cost when you're doing a major remodel

get a higher LEED certification.

A couple other things. You talked about how do you pay for it. And as a government agency, we can't give anything away free. So that means even if our employees or the public are charging at county-owned stations, we have to find a way to charge back for that. And we don't expect to be able to recover our initial capital costs, but we hope we can establish a charge back system where we can break even on the energy provided.

County is doing a lot of other things in the energy area. We're currently building a fuel cell at our county center that's going to be open in a few months. When that fuel cell opens, essentially I'll be able to charge county vehicles at the county center for almost nothing because they're going to have excess power on the night -- during the evenings and we'll be able to charge and it won't cost the fleet anything. So these are other things that we're looking at in our deployment is how to maximize not only what we're doing in fleet, but what we can do for the public and what we can do for the workers as well.

So with that --

MR. MARKEL: Thank you, Dave.

Our next panelist here we have Alex Keros from General Motors. Feel free.

MR. KEROS: Thanks. I don't have to introduce myself.

A lot of valid points to date. So I'll break my comments into two buckets.

The first, what is unique about the Volt is we're talking 25 to 50 miles and then we click into a range extender. What we think will be unique about our customers is want to be maximizing those EV miles. So we actually have already -- we have deployed our catcher test fleet which is our early vehicles to our employees to get feedback. And we've done a couple hundred to date. And we've noticed that the workplace charging has become actually pretty integral into their activities. So somebody who might be in that extended range driving mode has now turned into a pure EV driver because they're able to capture sort of that plus 50 percent if you will, where their 60 mile commute now can be maximized. So you know, from that standpoint, if the goal policy or publicly is to maximize EV miles, not withstanding all the issues associated with it, having workplace charging certainly makes a lot of sense.

What also it makes sense for, few have touched on it, but it's going to become increasingly more important what we need to do is divide strategies to get ourselves there. But when the home doesn't make sense, and perhaps

the workplace makes more sense than the alternative public infrastructure, how can we incentivize, educate, and give a little bit of support to that customer who wants to bring that idea in.

So certainly it might not always be the best case. But what a good first step is the outreach to employers on I think all varying scales. Bob said he has 34 locations with more than 100 places. You know, it's maybe the employee's drive the need for the charging rather than the installation of the charging in and of itself. So the workplace charging can become a very novel solution if you will to the next best alternative for a driver who can't do it at their place of residence. And I would like to hit on Dave's points. And to me, it's one of the most novel simple approaches to asset utilization, right.

There is a big concern everybody is out there talking about the public infrastructure we don't want to put it there. There's the half of the world says put it there for public viewing just to give people confidence. But imagine if we took a piece of equipment and we're not just charging with it, let's say, 50 percent of the time when the car is home. But now we're thinking of 75, 80 percent of the time. You know, that's pretty nice capitalization of an asset. Is there novel ways where we

can wrap up the fleet's paying the capital costs, the drivers are paying the usage fees, those sorts of things associated with an asset that it's really just an increment all cost now for a customer to take -- or employee at that time to take advantage of it.

So that's wrapped up in -- there's probably not a lot of people out there who have time to study how to make this happen and doing where there's outreach to their employees, their outreach to employers to create this network.

So the question I would ask of the group is how do we better incentivize? How do we better educate fleets and workplaces to be able to accommodate some of these they make sense in stalls because the home or other places don't. So certainly open for discussion. But it's a great approach to think to explore.

MR. MARKEL: Thank you. Thank you, Alex. That was a really good perspective on it.

Our next presenter panelist is Richard Lowenthal from Coulomb. I appreciate you giving us some comments on what you think on the --

MR. LOWENTHAL: So first I wanted to go back, Tony, your initial comment about this study. So SAE did a study last year for those of you who want to find it, it's SAE 2009-011311. And that study was of the plug-in hybrid

and what it would do with and without workplace charging. And it's actually representative of the small battery issued, which is one way to make your battery go twice as far or require half the battery is to charge tries a day, charge at both ends. That was kind of the interest point of that study. And they used the Chevy Volt as the model and what they found was that the difference of workplace charging made was 50 percent reduction in liquid fuel consumption and 30 percent reduction in greenhouse gas emission. So very significant difference.

You know, we've heard about the average commute being under the 40 miles the Chevy Volt will do. This study showed that whatever your driving pattern is in the end if you charge twice a day you save a lot of gasoline in a PHEV. So it was an interesting study.

There was a similar discussion that we had with Toyota, because Toyota has taken a different tact than General Motors in the size of the PHEV battery. So the Toyota Prius that are run, they've got a few out there that they've prototyped and they're letting people drive. Have a very small battery, 15 mile range. And there since the average commute is 29 miles, charging twice a day will make a tremendous amount of difference in how many electric miles we get.

So a whole other perspective here is if you want

to help reduce the price of the car, the Toyota strategy was the car can't cost more than $20,000. That's going to set our battery price. That's the opposite of what most auto makers done and decided. They've said what do we need in terms of battery size and that will set the price of the car. But one of the ways they make that work is by charging more often.

So there are really four reasons that you have public. Let's say outside of the car owner's single family residents kind of charging. There's range, range anxiety. There's a fleet, or if you can't have a station at home. These are the only four reasons that people want the station outside of their garage.

And as Dan pointed out, I commute in the Mini E, the BMW's trial car, and I do all my charging -- almost all, I'd say 90 percent of my charging at the office. But I do that for the range reason. So because when I get to work otherwise I'm down a quarter of a tank. I think of it as a tank. You know, my mini has a 4 gallon gas tank equivalent and gas stations take four hours to charge it up, to fill it up, right. So it makes you think differently. It's like the yellow light is always on. So I like that little tank full during the day, because I don't know always if all I'm going to do is drive home.

So my Mini E always has itself full range

available to me all day. And yet, I'm an exclusively off peak charger. I get into my office at 8:00 in the morning and I'm charged up by 9:00. So you know, the size of the battery doesn't determine how long the car is on the grid taking energy. And the amount of time you're plugged in doesn't determine how long you are on the grid taking energy. It's how many miles you went. And my average commute is 15 miles. So I'm done in an hour of day, and so not effecting the grid. That's one of the knocks on at home charging is peak charging issues.

And with an interesting comment, somebody pointed out earlier if you go home and plug it in at 5:30, actually you're still on peak. To home charging, you need the nuance of when you want to charge if you want charging to be off peak. And this equivalence of home charging to off peak is -- needs to be further explored.

We've installed workplace charging station at Apple and Net Flix and Pixar and Dell. It's getting to be the thing to do.

It's very interesting in these companies once you get through the border of getting the first one this stalled, it becomes like parking lot furniture. And for these companies, it's now parking lot furniture. By that I mean it's like a light or a stripe or a bumper. It's gone from a strategic decision that maybe HR made as a

benefit for employees, which was talked about, to now it's a facility's decision. When you build a new parking lot, you put in charging for electric vehicles. It's like having an ADA space or any other space.

The nice thing about that is they think of it as when you put in a parking lot, when it's dramatically cheaper, less than a third of the price to put in charging infrastructure if it's not a retrofit. So that's what we're seeing at these companies now. They like the LEED point. Certainly the LEED point was important in their decision to get into this -- to have workplace charging. It was really for like a couple of their employees bought Tesla roadsters and they want to accommodate those employees. But now it's quickly transitioned to this is the way we do business, build a parking lot, put in workplace charging. So very, very interesting space.

And finally, you know so I told you the four reasons that you have public charging: Range, range anxiety, fleet, or no station at home.

The two reasons to not do it are the stranded asset problem or the on peak charging problem. And I just want to comment since we're also supposed to address fleets a little bit. It's definitely not a stranded asset. You buy fleet charging because you have a fleet of vehicles. We see that in San Francisco, too. In fact,

they can never accommodate my car in San Francisco because their fleet is there. But the other thing is they generally speaking charge off peak. They generally speaking charge at night.

Fleet for those cases where you might be tempted to charge on peak is also very sensitive to pricing, to TOU pricing and demand response and all of these things can be worked into a fleet, who plans their energy use and so generally speaking fleet doesn't touch on the two real negatives of public charging, the stranded asset or on peak.

And the same thing with workplace. Generally speaking, workplace what we see is that the most of these workplaces put in one or two charging stations initially. Very few just to get started and signal to their employees they allow it. They don't put in a big field of them. They put in one or two per lot. They put in a lot of wiring when they do a future lot. So a lot of conduits for future spaces, but not a lot of charging stations because they don't want the stranded asset issue either. So I think those problems are well addressed. Workplace is a good place to charge.

MR. MARKEL: Thanks, Richard.

Sven.

MR. THESEN: Sven Thesen, Better Place.

And I think I would agree with all my fellow panelists in solitary of Dave being the lonely fleet person.

Inside of the market, what stage of the market are we at in California? We're at the beginning stages of the market. And they're early adopters. And there are early car sales. So they're going to work the OEM as hard as possible with the utilities to make sure that there is home charging available and that there is only people that really want a vehicle and really can convince the OEM -- at least this being my experience in going through my Nissan Leaf purchase that I've had to put up a lot of things saying I'm moving houses. It's okay I don't have the EVSE at home. I will make do with 110. I am not worried. Don't let you be worried about me having a negative experience because I know about EVs. So they will be taking care of the homework place.

But for example, at our office down in Palo Alto, we have people driving both from San Jose and San Francisco down and they've all said we'd love to buy an EV. We're all early adopters, because we can't drive down and then back up without being left with 30, 20 percent state of charge and we're just not there yet. We're not enough of an early adopter. So this need for workplace charging that people will charge them is very

real and needs to be done.

Now, again, stages of the market in that these are the early adopters, they get how much they have to charge. But when you go further down, you have the next band of adopters that are the early adopters. Are they going to be like, oh, my goodness. I've suddenly gone a range of 400 miles, 300 miles down to 100 miles. I may charge everywhere I go. And that means if you're at work and they plug-in at work, that they may be stuck there all day and realize -- and Richard said that you're charging at a rate at roughly six kilowatts, which means roughly 20 miles an hour of range. So that vehicle, that person who's got that range anxiety may only need three, 10, 15 miles. And if they're charging roughly 20 miles at 25 cents a kilowatt hour, that's a dollar 50 day maybe a benefit of less than $400 a year that they are sitting on that as set.

And so we're going to have to provide training to employees about whether it actually makes sense doing this whole EV education that goes forward if that you don't want to have a whole bunch of people that are just getting a few kilowatt hours out of this whole education process.

This whole issue of how long does it take to charge, it's actually very short, twenty miles an hour. Think about how long you drive and then also think about

do you go out and leave for lunch. Because if you don't go out and leave for lunch when you drive to the office, park your car, plug-in your car, again, that EVSE is suddenly captive to you and you may not put that much energy into it.

So we don't want to install huge amount of EVSE if I'm just like Richard said. But you want to put the conduits in early. And as part of this, Better Place is part of the general electric to provide this smart charging, to provide this fleet education to take care of fleet services for these fleets of EVs as they come in.

Thank you.

MR. MARKEL: Thank you, Sven.

So I've heard this comment a couple times in here. I've heard it a little bit in the earlier session. How are we going to manage either in this workplace setting or other areas sort of this reservation system and moving vehicles around? Are we going to have a valet service that moves the cars out of the charging spots so somebody else can use it? Have you guys come up with any kind of solutions for that?

MR. LOWENTHAL: We are developing a reservations system. But in the workplace environment, I think it was Bill that had it right. What happens is people gravitate to the same space every day. We have a few in

front of Coulomb and the same person parks in the same space every day. It becomes kind of their -- it's reserved.

Now, that's not going to be true in the fullness of time. And in fact, we looked at reservations and people want pools of spaces actually in workplaces. So there should be a set of parking places where anybody can charge. If nothing else, ultimately we'll have a lot of visitors that drive EVs, too. So you don't really need to reserve them. You have to have enough. And you know, these days with not many vehicles, that's pretty easy. Over time, that will become more of an issue.

Ultimately, we do need reservations. But I think it's more for the range problem than the workplace problem. You know, if I drive to San Francisco, I need a place to charge or I don't get home and see my wife tonight. So that's where I need a reservations.

MR. BOYCE: Historically -- and I think some of the EV drivers like Dan or Mark can talk about this probably at length. But actually the very, very early adopters were very cooperative with each other. And a lot of the strategies and a lot of workplace and public for that matter was to install an EVSE unit that more or less straddle two parking place. And they would actually put, you know, little placards telling each other what they

needed to do for charge that day and two people, two drivers like I said they become very, very located around that charger. And they would actually cooperate to make sure both parties got a charge. And that really didn't get into too much conflict on that.

But you would find out once in a while that one car would have a problem charging and then it would effect two people and not one person. So there were some logistics on that that I think the technology that the very, very early adopters, you know, found work arounds for their solutions, which I kind of get on to that and wanted to bring that up.

There are -- the drivers tend to be very resourceful. They tend to find solutions that work for themselves and they tend to get really repetitious. And I think even looking at some of your research how much of our driving is commuting versus other types of driving. When you really have repetitive type of driving patterns you can develop those types of solutions. So I think in the future we will need more flexible systems. But you know, in the real, real near term there's always a will, there's a way.

MR. THESEN: I think, Tony, it really boils down to education and making sure that person, that not early adopter that's suddenly afflicted with range anxiety and

needs just to charge for ten miles or five miles, yet holds a parking space, a charger all day long, that you -- there is an EV ambassador at that large company and the real title is transportation manager, but one of the duties is EV ambassador. And because of all the EVSE installed and in smart EVSE we're going to be able to track who's charging how long and who's sitting there how long as well. So we'll be able to give that information to the EV ambassador who will go out and do some education and I don't want to say bump that person off charging, but to say we're going to hand out of the range anxiety woods. It's okay.

MR. KEROS: Let's not forget we'll have some technology to support us. Ten years ago, we didn't have smart phones telling us what our batteries were and those sort of things.

So I agree with Bill, these customers can't hide. Their car is right there. Anybody has seen Seinfeld, people are waiting.

But there will be novel approaches to say, hey, I need once my car is full, my smart phone is going to tell me you're done. I imagine over time common courtesy -- not going to be everybody, but these people will at least be wherever they are real time my car is charged. I probably need to get out of the way.

MR. HEAD: I think that it's pretty well been said, but the technology is going to handle this -- in my view it's going to handle this issue in that as we said the early adopters are very conscious of this. They're not going to want to use up a space if they don't need to take it all day.

And then as deployment of EVSEs gets more widespread, then there's going to be enough -- the general even in a fleet setting there's going to be enough chargers to go around.

But our fallback position in Sonoma County, since we happen to on the property and own the charger and on the parking place, we also have parking control. And initially on our roll out as we put a four-hour time parking limit on anything other than a county vehicle that parks in that EV parking space. Haven't been a lot of usage on that as yet. We anticipate a little bit more over the next couple years and that will initially be a warning or something like that. But we would have the authority to ticket somebody that stayed too long.

MR. CHILDERS: Craig Childers, ARB.

Back in the 1990s, Ford had a postal EV deployment and what they did was as was suggested they put EVSEs at the intersection of spaces, but they purchased dual cord EVSEs that weren't that much more expensive than

a single one. And when the first car was full, it would transition over and charge up the second charge. Would seem especially for fleets, as Ford learned in the 90s, and with workplace charging that we would have dual and quad cord EVSEs that would rotate through so they could be located at the apex of four spaces.

And Dave, are you still here? Do you make those right now yet again? They're on the shelf collecting dust. So it seems like this will be a -- it would be a good application for especially for workplace and fleet.

MR. HEAD: I agree with that. And right now what we're focusing on is all of our chargers that -- we have 15 on the ground so far. They're all level -- will be Level 1/2 chargers as soon as we get the Level 2 upgrade kits. But they're all ready to go to Level 2. We've looked at that. I've done an examination. A lot of the EVSEs in the market and now and what's projected and almost all the manufacturers are going to have some type of multi point charger in the near future if they don't have it already.

MR. DAVIDS: Dan with Plug-in America.

I just wanted to mention one thing that I don't think was brought up. For those employees that might be equivocating over putting in Level 2 chargers, in many cases, they can get their feet wet simply with Level 1.

It's not complicated to install. The vehicles are going to be there a long time, eight hours. They're going to take on between eight and twelve kilowatt hours of energy, which is not insignificant. And again, that just follows the rule of, for instance, at an airport short-term parking, that will be Level 2. Long term parking should be Level 1. Vehicle is going to be there a long time.

MR. MARKEL: I have at question, topical area that we talked just briefly on. I'd like to hear the panelists' comments on it.

The demand charge impact of doing this in workplace environments, most commercial entities are going to be on demand charge schedules. One plug-in hybrid charging during that demand charge period for that month, it could end up costing somewhere between 50 to 100 dollars for that one 15 minute period that the vehicle charges. So I'd like to hear the panelist's comments on how we are going to help businesses understand that and integrate with those types of systems.

MR. LOWENTHAL: I can give you some ideas. First of all, generally speaking, workplace it isn't a problem because as somebody said it's commute charging. So you're done early in the morning.

We have a feature with our system, and I think most of the intelligent charging systems will have, where

we allow our customers -- the owner of the station to set policies. And that includes pricing policies. So they can determine if there is different pricing during the day or if it's even not allowed during parts of the day. They can turn on demand response if they don't want people to charge when there is a peak event in the grid. So we give all of that control to the owner of the property, including if they want to use pricing to control it. So first, I don't think it will be much of an issue.

But secondly, if somebody does want to send out those pricing signals, they can. Those kind of pricing signals are there for a reason. They indicate a hurt in the grid when we're at peak load management issue. And so we've taken great care to be able to pass on those kind of messages that the utilities are trying to give to the consumer. And so we let our station owners pass it on to the consumer when they need to.

MR. BOYCE: Bill Boyce with SMUD.

The other thing I think it is important to bring up from a utility perspective, most employers and businesses are a lot more knowledgeable about TOU rates and demand charges. So this really typically is something that their eyes open going forward when they install chargers. They know what they're getting into. Most of them are much more sophisticated at looking at their

energy bills and really studying the aspects of what that's bringing about.

So I would say the employers that are involved in that are very knowledgeable and, you know, it becomes much less of a problem and very typically the amount of energy use they have compared to the rest of the facility can usually be pretty insignificant with what we've seen in the past.

MR. THESEN: I just want to reiterate the number of 20 miles per hour charge rate. So you think about how long you commute in the morning you come in and plug-in and how long it would take you to top off your tank from that commute time. That's all. And it's really going to happen for those that plug-inadvertently omitted the morning. It's going to happen before 10:00, 11 o'clock.

MR. KEROS: To just add an additional thought here. And certainly employers have less latitude. But there are probably education programs. And some of these companies who are getting into this ahead of others where this becomes a need where there might be offset programs where much in the same way we've talked about for residents to get in there and do a site assessment that's more of a home energy audit type of assessment. And you're bringing in a PEV that maybe is adding 300 kilowatts plus to how do you mitigate that with coming off

of that.

And I imagine over time best practices will spread for certain situations with employers. It's very true. Employers are much more aware of what's going on and probably better prepared. That being said, they probably squeezed every little hanging fruit out. But if they're going to look at a program like that, it's probably fair to say, these are possibilities. How do we manage it? Is it controlling EVSE? Or are there other opportunities where they can look where we can take it that much further?

MR. MARKEL: I'm going to break in just for a minute because we have one question on the WebEx.

MS. MAGANA: This question is from Frank Ghazzagh, GRA.

His question is: What happens when everyone charges his cars at work and there aren't enough chargers? Will some have to wait until after noon peak time? And then who picks up the cost of that added infrastructure cost needed to meet the higher demand?

MR. LOWENTHAL: I think it talks a little bit about having enough chargers. What tends to happen in the workplace is that it doesn't change very much how many EVs are there are in a parking lot. And so you know, at Coulumb we always seem to have N plus one. There's one

more than we have employees who have EVs. So we don't see the problem much.

Will they turn into peak chargers, I don't think so, because what will happen is people -- people don't go to these charging stations like you go to a gas station. They go to it much more like they go to a parking meter. They arrive at work. They plug-in the vehicle and they go to work for eight hours or whatever. So it's not like they go out and unplug it and move their car during the day. It's more of a parking space feature than it is a charging tool in the mind of the driver. So you have to have enough is really the answer.

You know, we have a lot of -- there is a lot of discussion now about what's too much in terms of public infrastructure. But if you look at it, I just picked up Chevy's number today. You know, Chevy is saying we're going to have 51,000 Volts in California between 2010 and 2010, a lot of vehicles. You know, the concern that we'll have too much infrastructure is probably not well placed. There will be plenty of vehicles here in the next few years. So I think people need to stay a bit ahead of that.

We're not seeing that in workplace. People either buy for the number of vehicles that are out there. They tend to have an arrangement with the driver that is

the company has an arrangement with the driver where they're allowed to use that space for charging. So fairly well planned.

Finally, the thing I'd say is when a new parking lot is built, the cost of EVSE is relatively small. It's small compared to the cost of a parking space. A parking space in a parking structure is a $15,000 thing. So the addition of a charging infrastructure is not that extraordinary of an extra expense when you're building a new parking structure. So I think there will be adequate infrastructure.

MR. MARKEL: I think we're going to have to bring the session to a close. I have one last question. I'm going to let Sven have the last word. What's the percentage of parking places at a workplace that should be covered and what timeline?

MR. THESEN: That's exactly right. That's going to vary by region. In Israel, our first deployment, there are a lot of people that live in multi-family dwellings, so they're going to need a place to charge. So in their case, we have a higher workplace deployment. In the Bay Area, certainly the beginning because, what, five million cars in the Bay Area because we all want to convert to EVs. It's going to be the second car that's going to be the commuter car that's going to be primarily charged at

home. So we may need less. We certainly need less than Israel. But we have to think about the long term here, the long-term market and getting everybody out of their combustion engine and into EV. And it's not going to be early adopter that will by hook or crook charge, but those next stages of EV purchases that they saw their neighbor by them, but oh, my goodness. I'm dropped to 100 miles of range, where am I going to charge?

And I think the key thing here is to get statewide regulation that said any time you build a new parking lot that you run conduit to provide EV charging for a solid percentage 10, 20 percent for that. That's -- tom Turrentine is going to be important to flex that number. But it's not going to need to be massive, but it's not going to need to be zero.

MR. MARKEL: He avoided answering the number. That's the end of our workplace charging session.

(Off record from 2:24 p.m. to 2:28 p.m.)

MR. CUNNINGHAM: Good afternoon.

The second or third session here on public charging, this one on commercial property applications. I'll be very curious to hear about some of them are talking about how this fits into the broader public charging network.

This will be considered an application such as

big box stores or other retail outlets that would be providing public charging for their customers. And so I'll go in a similar format as I did before where I'll ask all five panelists here to give a quick tee up on their teams they see in this category and then we'll do a Q and A back and forth.

And there are seven items listed on the agenda as appropriate for this particular topic. I would like to highlight four of them.

The first being a need and purpose. So how does this particular type of public charging fit into the broader public charging network?

Second being whether the various business case propositions, some of them we've heard are going to be free charging if you're a customer of some store and some might be paid.

A third one being again a similar issue to any public charging how would this particular type of public charging address the on peak concern.

And then the fourth one I would highlight are -- the seven are there unique opportunities to integrate public charging with renewable on site power in this particular type of public charging. It's big box store you have flat roof application where they may have renewables for their own building loads any way.

So I'll stop there and start with Karen.

MS. SCHKOHNICK: Thank you, Jonathan.

I had a presentation. I don't know this we can share that or should we just get started? That's okay.

I'm with the Bay Area Air Quality Management District. And just for introductions, we have a nine county area. That includes the greater bay area. Many of you have heard of San Francisco. We've talked a lot about the challenges of San Francisco. But we also some very rural areas, including Marin and Sonoma and Napa County and some other agricultural areas as far as Santa Clara County. So we have a very diverse area with approximately 7 million people.

We also are one of the areas that is known to be one of the largest areas for early adopters in California. So we're very excited that we're going to be potentially having a lot of EVs coming.

I want to share a little bit about what we've been doing in the Bay Area. This last past year we awarded over 1.3 million dollars to 18 electric vehicle charging projects. Out of those, it's interesting it's going to fund a total of over 400 J 1772 charge points -- oh, go. We'll go ahead and continue on maybe slide number four. Fantastic. Thank you.

So as you can see, we have funded over 400 charge

spots. Over 400 of these are going to be Level 2 J 1772 spots. We also are looking at installing 6 DC fast chargers. So we're starting to build a small corridor. And we also will be very pleased to be funding a pilot battery switch station, which will also be in San Francisco.

As far as what the mix is, these 18 projects represent -- or approximately 78 locations where the infrastructure is going to be placed. Eighteen of these we can categorize as workplace locations. So those are employers based on the conversation we just heard. These are employers who have decided they want to purchase charging opportunities for their employees. Sixty of these so you can see the vast majority is commercial locations, which is what we are discussing here on this panel. And these are represented by the big box stores and other retail outlets. And within the 60, six of these also would qualify as corridor locations given they'll be collocated with DC fast charging at Safeway locations.

Next slide.

This map -- it's hard to see. But we would be really glad to send this to anybody who's interested. Actually, there's lots of different things going on in the slide. To the right, what you see is the infrastructure that was put in in the late -- in the 1990s through 2000,

a lot of it through Clipper Creek and other efforts.

So what you're saying are actual locations identified. That doesn't represent amounts of equipment. But it's actual locations where the equipment is located and it's over 100 sites in the Bay Area.

On the left hand side, what you see is superimposed on top of that is the additional 78 locations and the quantity of equipment that will be found based on this allocation of $1.3 million. That will be installed by the end of this next year.

So you know when we ask the question is there enough commercially available number charging, we don't really have many cars or many cars that can use this equipment yet. So for the time being, we might say maybe. Now is a really good time to take a look at the impact at least in the Bay Area. We have some equipment that's going to go out there that we can learn from and use that information to make decisions.

Next slide, please.

Also what we're starting to do already in our Phase I at the Bay Area Air Quality Management District is to really focus on that question through a regional strategic planning process and also to work on streamlined permitting with our local permitting agencies to make sure that both through there and the utilities that we really

minimize installation in deployment and really make sure that we have good customer experiences.

So what we're doing for that is beginning to identify best practices and a lot of that is coming out of what folks in the room are talking about. In San Diego, there is a lot of experiences in other parts of California. So we want to work with everyone to really again identify the best practices for streamlined permitting and to then conduct workshops locally to provide that information back to our permitting agencies and other key stakeholders.

We recently conducted a survey that we're still gathering information on. So far we've had about 39 respondents, represents about 39 jurisdictions out of about 100 in the Bay Area. So we're pleased with the results so far.

But while most of the permitting agencies indicate they're aware of the EVs and have process for it, they're eager for information. So again, it's a really exciting opportunity to be able to provide them with information to help ensure that they can do a better job locally.

And as I mentioned also, we'll be conducting a regional strategic planning process in partnership with our sister regional agency, the Metropolitan

Transportation Commission and also the Association of Bay Area Governments, ABAG. And we're going to go to assess Bay Area's readiness for EV deployment and identify any gaps and also to see what kinds and mixes of additional chargers we need.

And then through that, we are going to develop criteria to inform future funding priorities. Again, there has already been a significant investment. Our $1.3 we estimate represents about $10 million of investment in public charging just in this last year. So we definitely want to take a look and see what we should do with future funding.

And that brings us to Phase 2, which is our Board on August 4th allocated 5 million dollars for the next two years to invest in supporting EV charging infrastructure in the Bay Area. We want to fund home chargers, more public charging, and also fast chargers to make sure there is a corridor where folks could have at approximately ten mile intervals access to fast charging. Again, to make sure that our area is EV ready.

We have come out publicly and talked a little bit about some of the numbers that we think the mix might be initially. We estimate that it will be mainly home chargers. Initially we said 3,000 home chargers, 2,000 home chargers, and 50 fast chargers. But at this point,

again, given that there has been a big investment, we are very interested in seeing what the results of our strategic planning process are. We hope to have that concluded either in January or early spring of 2011. And again, based on that, we would be very glad to come back here and to answer the question what is the right mix of infrastructure going forward.

So with that, this last slide just for anybody who's interested, these are contacts at the Bay Area Air District. Michael Neward is there in the second row on our staff as well, my colleague. And we would be very glad to answer any questions about our program and what we are doing in the Bay Area. Thanks.

MR. KEROS: I promise I didn't sponsor this. Thanks again for being here to comment.

I've got to pull the other previous comments and actually tip my hat over to Karen's team and all the people who have been working on that plan. It's obvious there would be a honest tension if I didn't come up here and say the Volt needs public charging. It's a pretty transparent, hey, GTC's the technology solution and the vehicle itself to mitigate the issues associated with range anxiety, opportunistic charging and those sorts of things.

That being said, balancing what we are putting

out is actually very important here. And certainly GM is very focused on residential. We talked about it.

The second best place we think is workplace. This is in part for the simple answer that's where the cars are. In general, it probably going to be the cheapest solution to put in the equipment are going to happen. But that's not to say that GM is anti public charging and it's not to say that we don't believe in a fruitful and thoughtful fashion that public charging shouldn't be deployed.

So now tipping the hat to what the Bay Area has put together, folks in San Diego have done very similar work where it's taking a very deliberate look at what exists in taking very deliberate steps to grow. You know, we can always put another one in to a certain degree. And I'm sure some people debate me on that. But we can always put another one in. But it's always difficult to put that one away after we put in the investment.

So in a nutshell, what I think the plan we just walked through is a very good example for all of us to say, okay, what's the nominal installation that we need to do to kick this market off to get people comfortable? Is it every ten miles? Is it every five miles? What's the nominal corridors? And we'll talk about it a little bit later. But all of these pieces start to come together.

And I'll go back to Bob Graham's comments, which I share, is the big box stores and the retailers, is that going to be the best use of -- I'll say public access to take advantage of a 20, 30 minute wait? Now, I have an opinion. But that box store has an opinion and the box store should have the right to try to go out and attack those customers that they show. So think it makes sense.

That said, this room is trying to decide how do we support where do we support and who's doing that supporting moving forward.

So this is one of those buckets of money. Is it a critical need moving forward? In some cases, perhaps, very critical if you will moving forward and how do we build on that.

So without getting too much into the weeds and without saying, I think we can take some very deliberate steps. We can do some assessment and we can always go back and add a few.

That being said, we also should allow those that want to take their own capital risk to put these in to think that's a business proposition, to take advantage of it. These are these novel business approaches that are going to drive themselves, if you will. And if Starbucks, McDonalds, any of these folks think they can make a business case out of it, we should let them.

Again, Costco supposedly under prices gasoline. I don't know. They sell a large volume, right. But that's part of their business model. And they do well with it. And for that matter, others coming into the space should be able to compete in that marketplace.

So free market enterprise speech there. Sorry. Soapbox.

So again just come back into these types of big box retail types of things are a little bit more opportunistic. A little less necessary from our point of view, knowing where our technology comes from. But we can do this very deliberately and make some sense, such as what you see is happening in the Bay Area.

MR. KARNER: Well, I'll take an adverse view to that, Alex. So let's stir it up.

I've already talked a lot about what I think the need for public or commercial charging is. And I guess you know, we ought to kind of clarify some terminology, because we use kind of public and commercial and residential and some of that all flows together. So in our lexicon, residential charging, home charging the vehicle owner, the property owner are the same and you're charging typically one vehicle. Fleet, the vehicle owner, the property owner are the same and you're typically charging multiple vehicles.

Commercial, the property owners, i.e., the owner of the charger and the vehicle owner are different. And public, the property owner is government. And so you know, if we're talking about commercial charging, Alex, I think you're right in the long term. This is a business decision for a Best Buy, for a BP, for a McDonalds.

And we're working with -- crossed over to the dark side and are working with BP to install DC fast chargers and BP and Arco stations. We announced a collaboration with Best Buy to install chargers at Best Buys to help understand what that business model might be. And I see that that's a role of government, to help with those kinds of things. To be on that fringe and help to roll things out, much like home chargers are currently subsidized. And some car companies are even subsidized. So those are things that have to happen in order the provide to opportunity for this infrastructure to roll out.

So as governments are looking at should we support residential or should we support commercial, there are aspects of residential that I think are appropriate to support. Somebody is going to buy one of these vehicles is going to buy a charger. There are very few people -- maybe Sven is the exception. Did you say you only did Level 1 charging?

MR. THESEN: You're talking to somebody who is building a house with a 200 amp lines going out to my EV charger. So, no. But you hear about early adopters that --

MR. KARNER: Some of which may think they're going to get by on Level 1, and initially they may.

But just as I think as we all have played with computers and cell phones, speed, whether it's of processing or speed of charging is something that we all want to have. And so I think people will soon tire of Level 1 and they'll move on to Level 2. Certainly in the home situation.

But again, I guess going back to the concept of what should government support, if we're supporting these things that need to be trailed, may or may not be successful. There may not be a business case at a McDonalds for a charger. But we don't know unless we try.

There may not be a business case for an E RAV versus a BEV versus a PHEV. We're trying all of that stuff. And I think that's an appropriate place for government to play as they're deciding where they're going to put their dollars. You don't need to compete in an area where there's already private investment coming in and it's working. What you need to do is plow the new row to grow that private investment. And I think that's the

appropriate place.

MR. PARKER: Thanks. Dave Parker with Clipper Creek.

I'm going to kind of predict our own demise here. My future of Level 2 charging in the public is it goes away after a while. I mean, I see numbers of 1.5, 3.5 and 1. In the 90s, we were there three to one. But I think one of the things we found is the drivers in the 90s after about three or four months or maybe after a year, maybe even two years they stopped using public charging, at least those half of them that's the only place they charge because they're kind of cheap and they didn't want to pay for the electricity.

But the other half of the people, you know, they just realize 80 miles they can drive all day. So I think we're going to find we can't put too much infrastructure in right now. We can't do too much for a long time because the cars are going to be doubling every year. So too much this year will be just right next year or the following year or whatever. So I mean, we have a long way to go until we ultimately install too many charging stations.

In the end when we get tracer rates where people are buying two cars per family, that's where we need fast charging. And that's when fast charging I think will

really take off. Now you have two cars. You don't have an internal combustion engine car. You want to go to Reno or from here going to L.A. So you can take advantage of the fast charging. And that combined with some plug-in hybrid solutions we can start moving to an all electric transportation environment. Some of the things we have to look at I think is look at the charge rate that we're using at different locations. If you're -- you know, people are coming in for a half hour to the grocery store like somebody mentioned. Maybe we need a six kilowatt charger.

But like Dan said, why do we have six kilowatt chargers in the long-term parking at the airport? It doesn't make sense. I could have charged a Tesla we get 110 Volts. I would just get done. If you travel, you're gone for a long time. If you're at the airport, you're traveling. So why have -- let's look at charge rates. Even at workplace, you can look at the charge rates that are needed.

My conversation with big box retailers the managers are -- you're telling me I am going to have people parking here and their incentive is going to be to stay longer in my store? And coming from somebody that spends about 150 an hour in Lowes, that kind of hits home. I get five dollars free electricity and I just spent $300

in Lowes. So you know, I think it's all a tradeoff. I think that's where incentives have to go. We have to go from paying for everything to incenting people to put in charging stations.

I've told this story a hundred times, but in the 90s we had this big program with Waffle House. We were going to put charging stations in a Waffle house. It's the Ruth Chris of the south. And everywhere you go there is a Waffle House. And everybody knows where it is. You know, I mean, their mom probably works there. So everyone knows where it is. You pull off the highway, you can find Waffle House.

Well, the problem was they didn't want people there longer than 20 minutes because they turn their tables every 20 minutes. So there was no way they were putting in a charging station that gave somebody an incentive to stay there longer. So our whole Waffle House paradigm saving the world fell apart.

And I think one of the things, despite all these studies we're going to do, we don't know what's going to work. And the weirdest things are going to work. We have no idea. It might be movie theaters that save the world.

But the other thing with the big box retail capitalist in me somewhere, you know, if we can even get them to sponsor charging stations on public locations with

signage or whatever that sponsored by Best Buy puts in a charging station at a public parking location. So we get that funding going on through advertising or whatever. But this has to move to the private sector. We can't rely on the government to fund all this public infrastructure. It gets too expensive.

The other part is when I talk about people not using it, actually I think if we charge too much money for it, it won't get used at all. It will defeat the whole purpose. We talk about the chicken or egg and we need public charging infrastructure out there in order to encourage people to buy cars.

Well, if we have all this charging infrastructure out there at varying rates, it's going to cost you and you know it's high. You don't know what it is, but it's high. It's going to defeat the purpose. People are not going to demand on that for their range anxiety. And even if they go ahead and get a vehicle, they'll tend not to use it. We really want to encourage them to use it, especially near term so they drive further.

It's like the TEMCO study in Japan. Let them know it's there, they can use it. They'll keep driving and use more miles.

And I think the only thing, Alex, I'll say to you, if I get a Volt -- when I get my Volt, I will plug-in

everywhere because I don't want to buy any more gas. So that's something to keep in mind.

MR. KEROS: You're not somebody -- you're typical.

MR. PARKER: Right. And too cheap to pay for it at home. But the last thing I'll end on -- and I think we can't say this point enough. The utilities need to be involved. Any incentive we come out with, it would be nice if we tie that to at least letting utilities know where the charging stations are going. If we are paying for residential, there ought to be a little line in there that that gives us the right to tell the utilities we have the charging station. If nothing else, it can start tracking the location of the charging stations.

You know, so if we can provide any kind of incentive to the people that allow them to give that right up, the privacy right, the small right, I think it would do a lot of good for all the utilities. So at least they can start planning proactively instead of reactively. Thank you.

MR. THESEN: Well, that's easy. I'll just second everything that Dave said.

One thing we haven't talked about though is the actual employees at the stores and these malls and these big box locations. And I think about Stanford Mall where

I want those employees who are there eight hours a day to have a place to charge. I'm not saying put it right in front. We don't want to put electric vehicle infrastructure in front anyway, because it's going to get out and we don't want that to happen. And we don't want the employees parking away the second best spot that's for the customers.

But let's make sure there is -- consider this. Remember that there are employees that work there that certainly think about Stanford Mall are not likely to go living in Palo Alto or Menlo Park. They're going to be driving long distances, and we want to get these people in EVs. So let's make sure there is some workplace charging at these locations.

And then from an opportunity charge perspective, right now every charge spot is a candle in the wilderness -- a candle in the darkness so somebody that is worried about range anxiety and they haven't driven an EV and is not a Marc Geller knows they can get a charge spot there. It's exactly the TEMCO study. They wasted a lot of money -- not wasted. They spent a lot of money putting in these quick chargers. Now they want to make them like the Brits did and the Americans did in D Day, which is make them out of rubber and so that you think they're there but they're really not there. We don't spend the

money.

But again to unencounter this range anxiety, we get people into vehicles. We don't think we can do that. But I've said this over and over again. It's much cheaper to put steel in the ground than to get people into therapy. So we need some practice structure out there certainly at the beginning that candle in the darkness to get over that range anxiety. I'm not talking about the early adopters. It's that next band and the next stage.

MR. JONES: I'm Michael Jones with Coulumb. I'll try to keep things short, because I'm sure everyone is getting a little tired here toward the end of the day.

First off, I do agree with one of the key points here is talking about range anxiety. And this nascent space of a market getting these stations out in the commercial sector that are visible, that are going to just demonstrate that a fueling infrastructure is being built is going to be critical to the longer term success of driving EV adoption. So we can certainly talk with that narrow segment of retailers, the Walmarts and Best Buys of the world that are out there putting in these stations. And it certainly does cause concerns that the public moneys are being spent for these type of private entities. They're in business for themselves and they need to create models that are going to live in the free market.

So I'm sensitive to the fact that we are in a short range scenario where some of the money that is going to be spent in that sector may not sit well with a lot of people out there today. But at the same time, it's what's going to drive the next level of adoption with vehicles that are out there in the marketplace.

One of the things as we talk about commercial just the definitions. I mean, today we're kind of talking about the in flux and how to best use this pool of funds. And as we break this down into residential and workplace and public, you know, this EPRI model where you have 80, 15, and 5 as your pyramid upside down. When you actually get into how you're going to spend those dollars in these different segments and who that money is going to, it's going to be really critical to further break that down into what you're actually going out as the target for that money.

So when you're talking about multi tenant dwellings or multi-unit dwellings, you're actually giving money to commercial entities, right, public entities. Because the end user is not going to be the purchaser of those stations. It's going to be the property owner. It's the drivers that are going to benefit in those communities. But it's the property owner that's going to have to be incentivized to put that system in.

So as you look at the formulas that you're working with, it's going to be important to segment those down further than just general categories of public and private and really give into some of the weeds so to speak of where these particular systems are going.

There's also some -- I was just thinking relative to the retail side, you know, aside from range anxiety, one of the issues that we haven't talked a lot about is emergency charging, the ten miles square grid where everybody can find a charger somewhere. Well, just by nature some of these brands that are out there have great locations and properties. So you know, obviously we talked a little bit about Waffle House. But maybe a Dennys does want somebody to spend a little bit of time there because they sell cocktails. I am just kidding. Bad.

Anyway, so just looking at some of this -- and also further just break down I guess some of these different segments is it's not just retail, but as you look into things maybe like private garages. And in a lot of communities they're going to be serving residents or fleets or some other different entities that need that type of stimulus to create the kind of fueling infrastructure we're going to need in the future.

So I guess my point there is we need to come up I

think cohesively with a set of definitions that takes the property, if different entities that are involved with those property ownerships, the sectors that may be addressing in terms of industry sectors. And then last but not least the end user or applications that are going to be driven by that.

And matrix out all of those different elements in some kinds of common language and terminology so as we make these spending decisions we know exactly what types of dollars are going to be targeted to a specific sector relative to whatever data that is being driven by the market on an adoption side with these vehicles.

MR. CUNNINGHAM: Good. Thank you. That's an excellent context from all of you. I have a few discussion questions I've started, and I'll throw out and then we'll open it up to the audience for a few.

I'll come first to the debate that Alex and addition started that Michael chimed in at the end on and what is the appropriate use of public funds for the infrastructure.

I think addition, you pointed out that there is a case to be made or some public funding for the commercial applications. And I guess I'd like to get some thought on is there -- speaking as a government employee and the California Energy Commission is going to have to think

about how they're going to spend their next batch of AB 118 funds, are there recommendations you can provide on the formula for how you would prioritize public funding in terms of if there is a case for commercial applications is that the higher or lower priority of the public applications. You know, how much of the commercial applications does it -- is there a need for getting operational the spending? So any thoughts on that to help in form the public spending I think would be useful.

MR. KARNER: Well, you've moved into an area I haven't given a great deal of thought to, not having public money to give away at this point. But obviously, one approach would be to look at how do we maximize the public benefit. Because as Michael pointed out, the ultimate benefactor of all of this or the people that are driving the EVs. They have charging available to them whatever the business model might be for that. If it's free charging, if it's a subscription plan, if it's pay at the dispenser kind of a program.

And all of those are potential business models that may work, even simultaneously. There's not necessarily one winner that's going to come out of all of that. Different locations even within one city, different cities, different areas of the country will no doubt develop different business models that fit within those

applications.

But the bottom line is that the ultimate benefactor is someone in the public. And so clearly leveraging would be one of the issues that you'd want to look at. How much -- because there are other benefactors other than the public. If it's a big box retailer, there's going to be some benefit. But there's also some cost to them. There's some risk to them. And so is there a sharing that's going to happen with this funding that's coming out and how can you leverage it to make the most happen?

And I think that then gives the priority almost in itself then that, okay, well, this one we've got three to one leverage. This one we've got .5 to one leverage. We're getting more for public dollar. That seems to me to create a greater public good, unless it's just such a weird project that it makes no sense. So obviously there's some limits to that. So I would start with leveraging.

And then secondly just what's just the general benefit? Is it going to be for very few EV drivers? Is it a very narrow public benefit? Like employer charging? My expectation would be that employers are going to make a decision whether they're going to put in chargers for their employees as an employee benefit. They may even

have to tax it if they're providing that benefit. But that's pretty much kind of a two-party decision. It's an employee. It's an employer. They make a decision what they want to do and they go for it. A great deal of funding for something like that has a benefit. But it's a fairly narrow one versus one that it's a charger that's more open to use from a variety of people, perhaps at a destination where there is a eliminate of people going to the destination. Even in various neighborhoods, you know, we don't want to put all the chargers at high end destinations where only people that are paying $200 for an event are going to have charging available to them. We want to have chargers available across the economic strata, across the geographic strata for cities. So that breadth of benefit and then the leverage I think are the two that come to mind immediately to me.

MR. CUNNINGHAM: Any other thoughts on that topic?

MR. THESEN: So I think when you think about home charging versus the public charging, I think we need to remember that there are right now in California $5,000 for the first thousand EV buyers. So part of me says, okay, you've given the drivers $5,000. Let's bump that number of only the first thousand up considerably higher and then take the EB 118 funding because that home person is

already got $5,000, don't worry about their home charging. They'll work that out with the utility and the OEM and then put this towards public charging because again what you're trying to do is provide the necessary safety in your minds that you're providing that therapy that you know that you can drive the vehicle and not have range anxiety and also realize that you are -- I don't think anyone is giving away charging equipment and the installation. So everywhere where you put charging, the individual, the entity is putting it in. No one is giving away charging and infrastructure. You got both -- yes except for the one Ecotality DOE grant for one region.

MR. PARKER: Except for those two.

MR. THESEN: But it's not infrastructure. You're giving away charging equipment, but you're not giving away the actual installation. That is going to wear out.

MR. PARKER: But those numbers, I mean, in a year they're done.

MR. THESEN: Right.

MR. PARKER: And it really isn't enough. And half of it's residential anyway.

MR. CUNNINGHAM: One more thought on that particular question and, we'll move on to a second question. Karen.

MS. SCHKOHNICK: Jonathan, I may be want to

answer this question with another question or thought. I want to throw out that a lot of this conversation overall has focused more on the incentive. Sven, you mentioned the incentive for the infrastructure that there's the installation and the cost of the charger. But there are other costs associated with this project over the life of the project. There's the maintenance on those are sold with maintenance agreements. You're going to have somebody come out and make sure the equipment is okay. If there's anything wrong, you're going to have to have somebody come and fix the equipment. And certainly if anybody uses the equipment, there will be a cost associated with the electricity. So these things aren't actually free.

I want to offer that at the Bay Area Air District when we had given out the grants, one of the requirements we had was the equipment was maintained for a seven-year useful project year, period. And we would offer maybe the CEC or ARB also look at those kinds of requirements going Ford. And given that, that there is a cost associated with that.

And I know Dave we've talked about this, about whether charging should be free or not free. And we do have a feeling that overall if it's free it does sort of set this perception that somehow there is this benefit

that somebody should get when actually there are real costs associated. And what that leads to eventually potentially is that equipment is may be not maintained to the agree it should be. If it becomes inconvenient or too expensive to use, people stop using it.

I would like to offer I think as consumers we are somewhat used to price fluctuates. When I drive around and look for gasoline it's not uncommon to see that yesterday it was 3.15 and now it's 3.23 a gallon or when I come to Sacramento from San Francisco there is a price fluctuation there. So I think as consumers we are somewhat open and expect that there will be this fluctuation. We also pay electricity and many of us have meters in our home and we're aware of time of use. So I think again this idea that if we're charging our car it should not be that unusually there would be fluctuation.

So I would just offer for commercial charging one of the questions you asked Jonathan had to do with the business model. And in order to make a successful business model, folks will need to be able to recover their costs and to figure out how to incorporate it, and to your points I think it is important that they don't overly charge to the extent it's sort of, you know, what is that you scratch your nose to spite your nose. I don't know what that expression is.

But you certainly don't want to charge more than it costs so people don't use the equipment. But at the same time, if we start setting the expectation it's free or it's heavily subsidized going forward, it discourages I think to some extent people from really incorporating the full cost and the early adopters and the first wave may use it. But then there's this sort of disgruntled feeling later on when it seems like it costs more when in reality it's just those costs were there. We just didn't really incorporate them initially.

MR. CUNNINGHAM: Just expanding on that, I guess, I mean, isn't -- I am not sure if this is exactly where you're going. But the business case can be there for giving away electricity for free if the retailers gaining new customers. So --

MS. SCHKOHNICK: Absolutely.

MR. CUNNINGHAM: So there certainly can be value in an incentive to maintain the equipment if they want to make sure people are coming to charge their cars. Isn't the longer term question once EVs become prolific in community that EV charger that retailer is no longer a perk, that there is an EV charger at every store on the block. At that point the issue becomes is there a business case for the retailer to offer the electricity for free. And maybe the case is no.

So I'm just reframing I guess the topic and as a time based issue.

MS. SCHKOHNICK: That's an excellent question. And I think to Alex's point, I don't think government ever is going to be wanting to be in a situation where we would advocate that someone shouldn't put in a charger because we have a business case for it. I think really the issue is where our incentives should go. And I think to Don's point government should really be looking at -- I think you had a neat expression, plow the new row. You know, we want to be looking to help the funds things that otherwise would be barriers or obstacles rather than creating sort of artificial subsidies that therefore undermine the intention or the effort.

MR. CUNNINGHAM: So let's take one question from the WebEx, and then if we have time we'll can come to one or two more questions.

MS. MAGANA: Okay. The next question is from Frank Ghazzagh from DRA again.

And his question is out of the house charging will be mostly done during on peak periods, increasing the peak demand. Who is going to pay for utility infrastructure upgrades such as transformer distribution circuit, et cetera?

MR. KARNER: Well, I think the whole point of

smart charging is that charging in commercial space or was noted charging away from home is not going to increase peak demand. And it really what we're saying is charging on peak. Peak occurs may be once a year. Maybe set a new peak. We haven't set new peaks in a while. It really it's an issue of demands versus generating resources when you look at are we going to have the build new generating stations. Up to that point, it's just economic dispatch.

And one could make an argument if I'm running a peaking unit, it's probably running on natural gas and it's probably a more efficient unit and making less greenhouse gases than if I'm running a coal plant at night because I don't want to drop that plant off. So I'm burning coal in a less efficient lower thermal cycle plant.

So there's a lot of complexity to this. And that's what goes kinds of back to what I was talking about in having strong interface between infrastructure and the utilities so the utilities can work with infrastructure providers to optimize that. You should never be in a situation where you have electric vehicle charging adding to a peak demand that gets you into a situation where you're saying I don't have generation to cover that. You should be shedding that. And more often than not, you can do that and have it be completely transparent to the user.

And in the worst case, you send them a text message and say we've cut you off because we're in a period of peak demand. You need to reorder your life because there is a situation, right. And it's not that you walk up to your car and go, oh, my gosh. It didn't get charged today. You're very well aware of what's going on. And as a result, you're paying less for charging in the long time.

And there is an education component that's involved to make people understand that. Because the one time that you interrupt them and you send them that text message, they're not going to be happy campers. But if they've been educated along the way and they know what the issues are and frankly there is no surprises -- it's not like suddenly load jump up 300 megawatts today and we had no idea it was going to happen. Utilities do forecast weather and forecast their loads and they understand what's happening and you can let people know that, too. So ahead of time they understand this might be a critical peak period today and you might get interrupted. So plan your life around it.

MR. CUNNINGHAM: Okay. One last thought and then I've been told we need to -- do we have time for one more question from the audience as well?

MR. KEROS: Just to add to that, today we've I think failed to base case this. And just a quick sanity

check here is the base case is not on peak versus off peak. The base case might be on peak charging versus filling up with gasoline. And what we need to understand is sort of the societal cost and benefit associating with those two happening, because we've talked about it and we've skirted around the range anxiety side of things. If somebody truly believes in range anxiety, they're buying a Volt. And if the next best alternative to them is not the Volt, it's still going to be a gasoline powered vehicle. And that's where on peak and all of these other things start to come in.

But we have to base case this for the financial people in here to really let's gauge it against what the next best alternative may be, which is the next best alternative after that. Thanks.

MR. CUNNINGHAM: Okay. I think John had a question. And this may be the last question we have time for before the break.

MR. SHEARS: John Shears for the Center for Energy Efficiency and Rural Technologies.

I just wanted to echo some of the points Karen raised because I was going to raise them if she hadn't. And I'm not sure if Bill Boyce -- I think Bill's left.

You know, given the sensitivity around budget issues and Energy Commission staff are doing a stellar job

of trying to manage the limited AB 118 resources and trying to make them to work to maximum benefit. I just want to again highlight this issue given David was saying that we need to get a lot of public/commercial, however defined that type of infrastructure out there. But admitted that at some point there could be this transition away from public level over to the fast charging. You know, Bill has a lot of data, and I think even at the March 16th workshop that's referred to some of the materials for today he talked about the O&M costs of the infrastructure. Granted, this is the older infrastructure from the 90s. I was hoping that the EVSPs might comment.

I've known Sven is also from his PG&E days, and there was challenges with the infrastructure. Could you comment on what you perceive as the relative differential in terms of how robust and hardy the equipment is today versus the generation of equipment that was deployed in the 90s and whether there was a real benefits or less of a cost that might be -- less of a cost to maintain the equipment, but it's hardier and more resistant to the embolism and those types of issues.

MR. PARKER: I'll take a stab at that.

I don't know if there's been much improvement at all. The connector is much better and that always broke in the past, at least one in particular. And I mean,

we've certainly thickened the walls of our unit. I mean, one of the things obviously you look at our units, we've shied away from making a lot of lights, a lot of flash because that always attracted attention. And at night, you don't want to attract attention.

So, you know, I don't know what's going forward. And that's why, I mean, personally I push it towards the private sector, because there is an incentive there to maintain the units and keep them up and running to bring customers in.

And this is the only reason I answered the question is so I can say this. One thing we've got to remember is we talked about people who's getting the benefit and all that. We're all getting the benefit. The EV drivers are paying more money to get where they're going than the rest of us and we are all benefiting from cleaner air. I think that's something we need to remember. No one is getting one over on us. We're all benefiting from this.

And you know, what I read this morning totally unscientific study by Audubon Green that two-thirds of Americans will not pay more to drive an electric vehicle or the ride an environmentally beneficial vehicle. They wouldn't pay any more money. So that leaves us 30 percent. And that's a pretty good penetration rate.

But if we could get 30 percent, I mean, things are going pretty well. And that's going to clean up a lot of air. By the time we get that kind of volume, I think the cost basis we'll be talking about a convenience basis rather than cost.

MR. THESEN: And I think what is different is this concept of smart charging of network charging so that you can charge in the middle of the night. You can charge to harvest that wind. You can charge as not to impact your local distribution grid, not even including getting up to adding to peak demand for additional power plants. Just that localized grid. And you've got three Teslas on the block. You can time the charging so they don't require additional transformers. It's the smart charging component I think that is different.

MR. KARNER: John, just specifically to address your question on maintenance, one of the huge maintenance issues last time as Dave said was the connector. It was very fragile. That's been improved significantly and virtually all of the designs to J 1772 are far more robust than what the adcon (phonetic) was. That was a huge problem. The other problem was the inductive charger. Very complex high maintenance most places you go that have multiple of them -- there's five of them and maybe one of them works. That issue for the most part has gone. 1772

no longer allows inductive charging. And so it's a much simpler internals to the device, sans the smart charger there's there.

So I would expect general O&M less, but the vandalism issue is one that we all need to address and perhaps even address from a public policy standpoint that you can't build anything that will withstand an aggressive vandal. And we've all seen the Coke machines that are really designed to withstand a lot. And seen them behind expanded metal with a great big lock out front and a couple of holes where you can reach in and get the Coke, because it's in an area where there is a lot of vandalism.

We don't want to be in that kind of situation with EVSE. We want this to be a pleasant experience. So location of the EVSE and having someone on the ground that's responsible for it, a local person, an owner that's responsible is huge. If the EVSE is owned by someone else and it's just kind of out there, it will get vandalized and it will not get fixed.

MR. CUNNINGHAM: Okay. We do have to stop. I thank the panel for the public commercial applications. And we're going a break until 3:30. Thank you.

(Off the record from 3:21 p.m. to 3:37 p.m.)

MS. BAROODY: For our last panel of the day, corridor charging. If our panelists could take their

seats.

On the agenda it says we'll have public comment at 4:00. It's possible we may go until 4:15. We want to allow enough time for this panel. And we have a couple of short presentations, one by BMW, Andreas, and also Sven has a short presentation. No. Oh, you don't. He doesn't have one.

MR. BOWERMASTER: I have one.

MS. BAROODY: You have one. Dan Bowermaster from PG&E has a slide to share.

Now that everyone is here, we'll turn it over to Tony Markel. Thank you.

MR. MARKEL: Thank you, Leslie.

Just want to get everybody situated here. We're going to talk about the corridor charging and the public charging approach now. You know, I think we opened the discussion a little bit in the last session talking about starting to talk about where this public side falls into it.

A couple things that I think the panel really needs to try to think about in this piece is somewhat the geographic piece. Obviously, corridor we're talking about how people move from one place to the other. So we need to identify those corridors. I guess it could be interesting to understand how to groups will coordinate on

that corridor planning and who vice for what locations as we go along and how that happens.

The other piece obviously is the timing again. We talked about that earlier. But we need to talk about how -- when is corridor activity important. I'll just share one small piece of my own information using a Mitsubishi IME at our facility. One, you need to go to a place down a highway area, you know, I spent a while trying to find a place where I could potentially charge it and be able to return. Because you run to the end of the range of the vehicle and you know you want to get back. And so these corridor pieces are really critical for people that choose to do that extra time, not just their normal commuting but when they want to use their vehicle for something more than just normal commuting. So very interesting things.

The other question that we kind of laid out earlier was how the community lays out the messaging and the visibility of those units so they get used so people know what to look for when they're moving from one place to another to get charging.

So with those few comments, I'll let the panelists give a few remarks and then we'll go into questions again. Bob.

MR. GRAHAM: Thank you, sir.

Southern California Edison has decided that our primary focus is getting the existing chargers upgraded to current J 1772 standards. If that is accomplished and if you look at a map, it creates a very detailed regional coverage. So in our discussions with the EVSE supplies, we've talked and stressed that very fact.

We know because we've looked at how the vehicle sales and done very detailed market analysis where we think the initial vehicles are going to be clustered to the point where I can tell you out of our 180 cities exactly how many cars I think will go into each of those cities. So I know where they are.

But the point we're trying to say is the key is not where people are charging these at home, but where they may be traveling to to charge somewhere else in the region. But it's just as important for us to have chargers in Rosemead and Anaheim as it is in Santa Monica and Long Beach and Malibu. So we're focused on that.

We know there's people doing mapping to support that. And because of the previous work that was done in the 90s because of those locations of what people kept at those location, we know which chargers are actually being used today, how they've been used in the past.

Working with AQMD -- Lisa has left. She's done an analysis of where all the charge locations are. It's

interesting why we do it. We have over 400 RAV 4 vehicles that our meter readers use and we want them to be all to go find places to charge, just like you talked about, Tony. So we've actually identified every exacting charge location that's up and running so our people can do it. We're doing no corridor planning at all. It's not that we don't support it. That's fine. But that's -- we support DC fast charging as I mentioned earlier. But at the moment, we're not paying attention to corridor planning. We think the regional infrastructure will give us the kind of coverage we'll need in our region.

MR. KLUGESCHEID: All right. I'm Andreas Klugescheid, Vice President of Government Affairs for BMW again.

What I'll do, I'll give you a couple of slides out of our research project that we do. If you could be so kind to go to the next slide.

So we have on a world wide scale project up and running currently in Germany and UK and in US China. Also in France we will be pretty soon. And specifically, in the Berlin project we were looking into the infrastructure issue and there again specifically into the question what kind of public infrastructure is useful for the users. We have 50 in Berlin and we had overall 50 charging spots.

Next slide, please.

And obviously we have a number of research questions. I don't want to go into the detail now. Go ahead.

That is the local distribution over Berlin in terms of charging spots. So it's more or less -- well, some focus in the year in the city area but also in the surrounding city corridors we had charging.

Next slide, please.

And here we go. So it turns out that during the time of the project during the first phase of the project only three out of the 50 charging spots were actually ever used frequently. It also turns out that only two of the users of the Mini Es out of the 50 were actually using charging spots. And that's for two reasons. Some of you have probably heard the story. One is the one user had the privilege to have public charging spot right at his workplace. It was workplace charging. And the other one was kicked out of his home and was forced to use public charging because he did not have his home base anymore. So that's the reality in bullet.

Next slide please.

Another interesting factor on that is linking the discussion of how we match renewables to the users. In Berlin, at least given the pretty good range of the Mini E only quarter of the cars have ever been charging overnight

at any one time.

Next slide.

Basically, that meant that only two to three times per week people actually charging for cars. In other words, most of the time the car was off grid. You need to know for your background that people were using their car more or less with a similar Mini with internal combustion engine or a 1 Series BMW, same size of class of cars. So they were actually doing around 40 kilometers per day, 25 miles per day which is average for similar internal combustion engine cars in that segment.

Next slide.

So overall, 56 percent of the users never ever use public charging at all. Routinely all of them had a garage. All of them had a home charging device obviously. And 94 percent were saying my home charging is okay. I don't need more than that. Okay.

Next slide.

When it comes to the question that we actually asked them if you could use public charging where would you like to see it? Parking lots of companies, workplace charging? Number one. Parking garages and then transfer places, airports, railroad stations, park and ride and so on had been the first three favorites. But again, you know, only under the assumption if you use it all.

Next slide.

That's a bit of a different story, but should be integrated in all of our thinking here. What kind of ecological relevance do you think have electric cars in 93 percent of the users in Germany were saying that only when the cars are powered by renewable energies they are really good for the environment. They serve the purpose. And that figure remains stable or was slightly increasing actually over time.

All right. So that is just a quick glimpse into Germany. That is not necessarily transferable in all respect. But it gives us at least some backgrounds on some of the questions that we raised today and it gives you some facts actually.

I have two or three other remarks when it comes to corridor charging, I think it's an important thing, but on the other hand, we shall not forget that electric vehicles are not the only mobility tool out there and will not be in the future. So in other words, that's you know kinds of Swiss army knife of mobility that we have today but the internal combustion engine cars that basically covers all of our mobility needs. Let it be driving to town or let it be driving up to Lake Tahoe.

That is not necessarily what electric vehicle will cover in the future. Let's not forget there will be

hydrogen cars. There will be fuel cell cars and so on and so on. So don't forget that actually in that discussion here. Electric cars do not really necessitate all mobility needs. And as a matter of fact, the users of the Mini E, we asked them all, basically understood this is a different kind of mobility tool.

Another remark of mine on the debate that we had today on the question of public infrastructure in general and range anxiety. You know, probably the only other word that I heard more often today was Chevy Volt actually. And number two probably was range anxiety.

So when you think about that and think that it more or less all the comments, range anxiety was taken as a kind of a reason of doing this or that. And we are talking hundreds of millions of investment here, right? I'd just like to know more about that famous range anxiety thing. I understand it's a GM trademark now, is it? But besides that, what does it really mean? You know we all have our assumptions. But let's think about it before we start throwing out money public money that is needed in other corners, not necessarily mobility, but also mobility. And desperately before we throw out the money, let's think about the reasoning behind it. I'm not saying that public infrastructure isn't noble. We car manufacturers, we love that. The more public

infrastructure, the better for us. The hurdle for the buyers will be lower and so on, so on. But still, there might behaviors better investments around.

And, yeah, besides that's basically it.

MR. MARKEL: Thanks, Andreas.

Don, do you have any comments?

MR. KARNER: Yeah. I guess I'll be the defender of commercial infrastructure.

I don't think any of us really completely understand how main stream vehicle users are going to adapt to electric vehicles. I don't put a lot of credence in data that comes from what I term cocktail cars, people that by cars so they can put them in the garage and at the cocktail party they can say, "Isn't it cool I have an electric vehicle?"

I think we need to get deeper into the market. We need to understand how people that drive more than 40K is a day are going to utilize their vehicles. Or are they going to utilize electric vehicles? Are we always stuck with people that want to be tethered to home and are perfectly happy driving 25 miles a day?

I think if we're going to satisfy the goals that the Energy Commission and the AQMDs are trying to achieve with electric transportation, we have to go far beyond that. We have to penetrate deeper into the buyer market.

We need to be dealing with people that commute 50 miles, 60 miles to work and find out what we need to do to make those people comfortable they can utilize a vehicle.

And it may be that you load the thing up with batteries and you have a $50,000 car. Or it may be that you provide some infrastructure along the way. Because I think there is a number of studies out that show you can put a charger in a whole lot cheaper than you can load vehicles up with batteries. And it last a lot longer. There's a lot to learn from that.

And I think part of what we're dying to do with the EV project, we're managing is to learn that because we don't have the answer. And so our objective with the project is to build mature probably overly mature aged kind of maturity infrastructure in these markets to overkill them. To make sure we have plans of charge infrastructure and see if we can get people the utilize it. See how they want to utilize it. Gather that data and then really learn for the next 50 or 500 cities what the model really is.

We're trying hard to penetrate into markets that have people that aren't going to buy cars just because they think it's cool to have an electric vehicle. We're in Phoenix and Tucson. We're in Chattanooga and Nashville and Knoxville, and there aren't all that many people that

think driving EV is is all that cool in Tennessee. They're looking for a tool, something that's going to save them money, something that's going to get the job done. And those are the kind of people that we are really interested in understanding how they're going to utilize their vehicle.

With respect to corridor charging, we're building corridor charging because again, we want to understand how people are going to use it and if they're going to use it. I tend to put a lower priority on corridor charging because I think first you have to develop some mature infrastructures and these micro climates that we talk about, cities that have a well developed infrastructure and not somebody goes from city to city along these corridors.

Our experience in the past in the 90s of course it was Level 2 charging. You know, we put some chargers along corridors and they weren't used all that much. But it's dedicated driver that wants to go along distance and only have Level 2 charging. But when you think about it, even with Level 3 charging, you can double the time that it takes to cover the same distance in a gasoline vehicle easily double it. So again, it's a dedicated driver that wants to do that. I think it's important to evaluate corridor charging. And I'm truly talking when I say

corridor between micro climates, longer distance between cities not like in Bob's territory where you've got a lot of freeways that are essentially the way people commute within that city. That to me is not corridor charging. That's urban charging and we're definitely deploying DC fast charging along those transit corridors within that urban area.

But we'll see. And we'll generate a lot of data on corridors. We're building a transportation corridor between Phoenix and Tucson, between Chattanooga, Nashville and Knoxville, between San Diego and L.A., between Seattle and Portland and actually going south of Portland. And it looks like working with the states in Oregon and Washington we may actually have a corridor from the California border to the Canada border with DC fast charging.

So there will be a lot of opportunities for us to learn and we look forward to the next 18 to 24 months to be able to come back and answer the question are people using this.

MR. MARKEL: Thank you.

Dan, do you have some comments?

MR. BOWERMASTER: Dan Bowermaster, the Manager of Clean Air Transportation at PG&E. If any of you were at the PUC workshops a couple weeks ago, I was the last

person on the last panel on the last day, and now I am the second to last panel. Guess I'm moving up in the world. So thanks, Sven.

This slide had actually been referred to a dozen times day and it doesn't say range anxiety or Chevy Volt on it anywhere.

But basically it's the famous EPRI slide and it shows -- basically shows over the course of the week if you haven't seen it before the seven different days of the seven different humps and where the cars are, the green is home. The red is work. The light blue is commercial. And then the dark blue in the very top is driving. Where is the percentage of the U.S. fleet at any time during the week. Can you arrange that to a pyramid or what have you but it shows you where the cars are.

PG&E is going the support electric vehicles regardless if it's commercial, workplace or residential. But that doesn't -- kind of the how priorities reflect this data. I guess that may be the next point. And Bob mentioned it this morning before lunch is that we just don't know a lot. We have experience in early adopters and a lot of hard work and all the passionate EV owners in the 90s. And we don't know what the mass market is going to be or what they need. There are a lot of great programs going on right now. The Ecotality project down

in San Diego and other parts of the country that's going to give us data in a couple years.

But the question that's facing us today is assuming we spend the money on infrastructure, where do we spend it? And then we'll get the data in a couple years. And I guess verify and do some consumer behavior and know if we were right or wrong. So unfortunately we can't do it the other way around. But it's chicken and the egg.

We do have -- PG&E and the city of Vacaville thanks to a CARB grant did put in one EV fast charger as far as corridor planning goes. If you haven't heard of it, it went into operation April 16th of this year, and it's about 30 miles west of here in a town called Vacaville which is actually a pretty good model for how to do signage and placing chargers. And this DC fast charger shares -- it's at a park and ride. It has a half dozen other Level 2 and Level 1 chargers. It's in a -- shares a parking lot with a fast food restaurant.

So the idea is that it's not quite halfway between San Francisco and Sacramento. But in theory anyway, a customer could drive to Sacramento stop off get a Burger King and then continue on his or her merry well. What happens when a second customer comes along and needs a fast charge to has to wait? Not only 40 minutes, that's a whole other question. If I want to get gas at a gas

station if I have to wait for a gas pump more than like four minutes, I start getting a little antsy.

So I would definitely agree with what Bob and Andreas were saying before as long as we don't know and there is a lot -- I'll speak for myself. I have a car in my garage. I could in theory drive it to Maine if I wanted to. Maybe in the future the next generation our kids, nieces our nephews, they'll look at us like they were dinosaurs. Why would you do that? You have a car that's good for your use 80, 90 percent whatever percent of your time. If you look a train, you fly, rent a car, car share, whatever it is, that's not an electric car. It's not purely an electric car.

So my point is there is a lot of unknowns. It's a question of how much to invest and where. And I, for one, don't have the answers. We'll have a lot of great data in a couple of years. And I agree with what Bob said this morning. We need that very, very in detail so we can make these kinds of decisions. But I'd be interested in hearing what the group has to say on that. Thank you.

MR. MARKEL: Sven.

MR. THESEN: Sven Thesen, Better Place.

I'm the last speaker on the last table, the last panel.

First like to talk to you about different fleet

and that is of taxis who drive 80, 90, 100,000 miles per year roughly five, ten X what we drive and with the corresponding petroleum use, the corresponding greenhouse gas emissions and corresponding criteria pollutes emissions.

And what Better Place is doing is we have third party battery ownership, separate battery engine ownership with a fully functional electric vehicle. And we hope to be implementing a program in the Bay Area that will install 60 some taxis between San Jose and San Francisco to make a corridor, electric vehicle corridor so you can get off an airplane in San Jose and say I want to go to San Francisco in a dedicated battery electric vehicle with a 100 mile range, and that taxi will be able to continually operate in the gas station of less than four minutes. That's what the switch station does is less than four minutes. The actual switching takes less than a minute. That will enable the taxi fleet to be continually operated to provide that long distance range within the Bay Area or the San Francisco to San Jose corridor. And we'll find out if we get final approval for that grants on the 27th.

MR. MARKEL: Thank you. Thanks, everybody, for your comments.

You know, I think our audience has not had as

much opportunity as they should to comment. So I'd like to open it up and ask if there's any comments from the audience about public and corridor planning.

MR. DAVIDS: Dan again from Plug-in America.

I want to agree with much of what I saw of the BMW driver survey. In the Puget Sound Regional Council project I mentioned earlier today we did a survey of the current and past drivers of EVs, largely those EVs were cars like mine from the California ZEV program and we felt that was a representative of sample and we largely came up with identical data to what you had.

I would add it looks like we asked the same questions, and we also were able to determine that the average daily distance the people went was 35.2 miles. So although on this Saturday I'll be giving an award to a fellow who lives in Claremont, California who has exceeded 200,000 miles on his RAV 4 EV. And does anyone care to guess how far he went before he changed his first battery pack? 155,000 miles.

So that sort of leads me to the early adopter question. And just as Andreas pointed out that we need to be careful with what do we mean by range anxiety, I think the behavioral psychologists need to look into defining that term early adopter a little bit more. Even though I'm in the business obviously and so is Marc and Sven

drives the RAV as well, I don't consider myself an early adopter because I don't treat the car like an early adopter. I'm not putting up with limitations or anything that I don't like about its early technology or its warts or anything. I drive it because it's simply a better ride. It's a better car in every way around, and internal combustion in a car.

And I think these people that I know who drive the 300 RAVs that are in private hands and everything, the fellow who put 200,000 miles, trust me, he doesn't have time to be a hobbyist with the car. He's driving it 25,000 miles a year.

And I'll just close by saying that in the movie "Who Killed the Electric Car," range anxiety and the lack of public charging infrastructure, those were not identified as suspects at all in that movie. So anyway, just food for thought.

MR. MARKEL: Thank you.

Panelists, any comments on that? I am hearing general trend that the public infrastructure is much less of a priority.

MR. GRAHAM: I don't agree with that. I think you have to have a reasonable level of coverage of public infrastructure. You know, the idea of range anxiety next time the light comes on in your gasoline car, tell me you

don't have range anxiety.

So the question is really how does it effect you? So there has to be a reasonable level of coverage with an appropriate investment that makes sure the region is covered and understands where people travel.

It would be a mistake to not assume that we need to have a certain level of public charging. Whether or not they need to be DC charging is to be determined. Whether or not they need to be Level 2, the locations need to be determined. But that can be determined with studies that are already there today. There are very good transportation studies out today that have been done by public transit agencies forever to tell you where travel destination are. To tell what you commuting distances are. They have those facts. We can use those facts to develop the actual locations. So it would be a mistake not to fund it correctly and make that happen.

MR. KLUGESCHEID: And I would support that view. So don't get me wrong. The presentation was not to tell everybody that public infrastructure is not necessary. That's not the point. It's a question of priorities and it's a question of actually before you invest money and moneys is not readily available right. That you really, really try as much as possible to actually find the business case behind it.

I am totally aware of that chicken and egg issue that we are all running into here. It's always the same of alternative fuels. So I have that with hydrogen before when I started with BMW. But let's try to get as much data as possible together and then make the decisions on a larger scale. I know that's probably consensus, I know. And it probably sounds (inaudible). But at times when I think about that Tokyo study that was quoted here before that you actually say, yeah, it serves the purpose. We have tons of unused public infrastructure in Tokyo, but at least, you know, the (inaudible) went out of it. That's probably not the way to go. It cannot be the way to go. Those saying earlier, Joshua Cunningham, we have so many stakeholders in the room and all around the electric vehicle issue and topic. I think we could come up with smarter solutions than just over building the public infrastructure in order to avoid the range anxiety. Right. There must be better solutions than that.

MR. KARNER: And Tony, I would just add that if we're looking at just public policy, where do we want to put public money? GM just announced they sold out their production. Nissan shut off reservations. You don't need to incent people to buy electric vehicles at this point. Demand is outstripping supply.

So all you're going to do with residential

charging incentives is to further reduce the cost to people that are already perfectly willing to pay whatever it's going to cost to get that electric vehicle. To me, that is ignorant use of public funds. It's very narrowly focused. It's just putting money into somebody's pocket of the -- it's a transfer payment. They're going to buy that vehicle and buy that charger anyway. So let's find other places to put the fund.

Now maybe five years from now or ten years from now we burned through that and we need some further incentives. But probably it's more like technology incentives, that type of thing. I don't think you're going to make any difference in the number of vehicles that are going to be deployed through 2012 whether you have an incentive or don't have an incentive for residential infrastructure. That's the reality of where we're at.

MR. KLUGESCHEID: I'm not sure whether you were referring also to the vehicles in terms of infrastructure, but there is no longer need of that because that's something that I would highly doubt actually.

MR. KARNER: I'm just speaking of further subsidies for the charging infrastructure. Just the Walmarts.

MR. KLUGESCHEID: Just the Walmarts.

MR. KARNER: Yes. SDG&E is not anti public charging as well. It's more making sure we have -- if you're looking at the numbers we do know right now the priorities being -- as far as where the cars are making sure we get the residential charging right. Making sure we get the workplace charging right. And this all happens in parallel. Nothing happens sequentially. But public charging, I think Bob said, it's fixing what's already there. And then seeing what can we do before we have this -- before we have all the mass amounts of data two and three years from now what can we do now to place an appropriate smart amount of public charging to encourage the market in its infancy.

MR. PARKER: I just wanted to take issue with what Don said about Tesla selling $109,000 roaster and people are balking at a $3,000 charging station. In fact, they dropped the price to 2,000. It haven't improved sales dramatically. People are opting for a less expensive illegal charge cord to charge the vehicle. And I think it's important. And regardless of the price of the vehicle, people need incentives to buy infrastructure. They don't really understand it. I think that's the benefit of having the correct infrastructure offered and having some kind of help for them off setting the price.

MR. KARNER: I respectfully disagree. I think

people do stupid things even when it's free. And some of the Tesla charge paraphernalia I've seen out there is just incredibly stupid things. There are probably other ways -- better ways than using public money to say somebody that can afford $109,000 vehicle to do something that's not stupid.

MR. PARKER: But we're not talking about the $30,000 cars.

MR. KARNER: And if you try to buy a Leaf and you say I don't need a charger, you're going to get a lot of push back from Nissan. If fact, you're going to have to sign a document that says I give up my lemon law right. So it's not that easy when you're dealing with that kind of a situation. Good.

MR. GRAHAM: I can tell you about the Nissan Leaf acquisition. You can -- if you don't like the price quote you get from Aerovironment, you can in fact go out and get an EVSE from another supplier. There is an 800 number on the Nissan website that you can go to. You just simply have to call them and tell them that you're getting it from another source. And then you have to sign a release to say that you're buying the one that's kill the car or whatever it's supposed to do. So they have set up a mechanism that you can actually acquire something else other than the Aerovironment system if you don't like the

price.

MR. KARNER: If you're buying another Level 2 charger?

MR. GRAHAM: Your lemon law right on the charger or the car.

MR. KARNER: On the car.

MR. GRAHAM: I don't think that's true.

MR. MARKEL: Craig, did you have a question?

MR. CHILDERS: Yes, Craig Childers, ARB.

I have a question for Bob and for Dan.

Bob, you seem to be somewhat positive on the need for some level of public infrastructure. And yet, I don't believe Edison or PG&E or any utility in California is actually planning on deploying public infrastructure as a part of a business case to sell electricity into EVs.

Is there a single -- for pay. Is there a single public charging station planed where Edison or SDG&E or PG&E will be selling electricity into EVs? I don't think there is a single -- I don't think there is a business case and I don't think that any California utilities are doing this. So it just seems odd to me we are putting it on the CEC to do the job here and not sharing it.

And if there is a business case, why is it the California utilities -- I understand that Europe is different. And in Europe, those selling electricity, are

constrained to being utilities and they're putting in the station in Europe and deploying public infrastructure. But have you -- have any of the California utilities reconsidered this and maybe thought about putting in a few as part of a business case?

MR. GRAHAM: Dan's looking at me. Southern California Edison's position, which is in writing, PUC filing, is we should not own or operate any infrastructure on the customer side of the meter.

But you need to be careful to not suggest we're not spending money because we are spending and will be spending money on the distribution system and upgrading the distribution system to support this.

So our rate payers are, in fact, supporting the evolution or the growth of electric vehicles. At the moment the position is that the rate payers should not have to pay for infrastructure on the customer side of the meter because we're doing it on the other side of the meter. So that's our position right now is whether it's the business case or not and we have a lot of history on having a company that was doing that in the past. We probably have that data. But that's not our position.

We currently believe there is enough competition. And you'll see in pricing today between the EVSE suppliers between those who are looking at making a business out of

these systems that that will be taken care of by the infrastructure side will be taken car of by the other EVSE suppliers. The question is to whether or not the CEC should fund it is a different question. And that goes back to subsidies.

I was actually with the city of Lawndale last week and gave a presentation to the city council and was asked the exact same question. And my answer was goes down two parallel paths. The first path is societal. And there's a lot of reasons society wise why the government should step in to support health, economic benefits, jobs, you name it. So there is a lot of society benefits.

But the other thing I told them in meeting at 6:00 this morning -- and in another hour I will be on an airplane. And most people in America do not travel on airplanes. Yet, the western United States, rest of the individuals pay for that airplane every time we go to the airport. So there is an economic value economic good to the country, which is why the country has elected to subsidize air travel, even though we don't all pay for it.

And I can flip that around and talk about public transit. We all pay for public transit. Very few people ride public transit. So that's subsidized because we think it's for the good of traffic and other reasons. There isn't any reasons as far as I'm concerned with the

public funding should not be used to support infrastructure especially in these early stages because we subsidize a heck of a lot of other things that are also important to us.

MR. KARNER: Well said.

HEARING OFFICER RENAUD: Yeah. That's about as best as you can say it I think. Let's take the next -- one more question and then I think we have to wrap it up to close the session.

MR. BRADY: Jim Brady, EV Connect. Been working EV projects for about three years and built two corridors, one in San Francisco to Los Angeles and one in San Francisco almost to Portland.

And I think the infrastructure is important. Couple things, depends, does it make sense to drive from San Francisco to Boston in an EV? Probably not to a lot of folks. Does it make sense to bridge cities so that you can use clean transportation when you get there and use some EV corridor to do it? I think it does and I think the EV is passionate about using that. Typically, on the models we were working with vehicles with larger battery packs and the models were two hours and 40 minutes of charging latency time if you will from like San Francisco to Sherman Oaks. And that was -- you know you're going to pull off and do your Blackberry. You're going to stop for

lunch in San Luis Obispo. You're going to go ahead and whether you're driving a vehicle or an electric vehicle, there's going to be a little latency in your trip unless you're 19 and college kid and you're going to go point to point.

But the issue is I think the EV corridor infrastructure is important and it doesn't come cheap. But I think the model might be the range of the new vehicles coming seems to be quite a bit less than the front runners as far as 2007. And that is that the intervals of the maybe first year we do them at 150 mile intervals. And then we come back and backfill and if we go one, three, five, and seven with quick charging, that works well. Quick charging is very expensive. But there's solutions and I would encourage it.

Thank you. I have a follow-up question -- follow-up comments from the ends section if that's okay. A couple things I got out of today was definitely the car manufacturers being generally interested in the right fuel and fit and flavor or the homeowner that is going to have at the EVSE at their property. The dual meter adopter, the multi utility TOU or EV 9 or A or B all the different -- it needs to be simple. It needs to be simple to the customer. I'm encouraged to hear the genuine flavor of the car makers to be interested in that.

I'll go further to say they also have responsibility to communicate that to to customers on the front end. What I'm coming to is site assessment. Site assessment is very important for the installation process. It may not be the flashy red paint of the conversation, but it needs to be part of the responsibility.

And I know there is different ways to look at this. Do you pre-qualify the buyer before that? Do you say, okay, you have a 100 amp service panel and 816 fill panel in the garage and you are going to need additional work so you give them Option B. It's going to cost more money than 600 bucks to get the installation in.

Not to go on and on, but we need the confusion piece potentially exists that we can squash early on if we do a pretty good job of communicating with the customer and providing the right message to the customer. So it's the new buyers that just want to have a clean reliable car.

Appreciate the session today. Great, great audience. Great panelists. Great resource and asking the right questions. Thank you.

MR. MARKEL: Thank you for the comment. I appreciate the impact from all of our panelists.

I'm going to turn it back over to Leslie.

MS. BAROODY: Tony, we have one comment from our

WebEx audience. We don't want to leave them out entirely.

MS. MAGANA: This question is from Adam Langton from the CPUC. His question is what roll should Level 1 charging play in commercial charging? Level 1 charging would seem to reduce equipment/installation costs and conserve those interested in topping off their EVs at work, shopping, et cetera. Is there a need for the government to play a role in supporting the installation of Level 1 charging station at commercial entities or in public spaces?

MR. MARKEL: I think I can handle that one for the rest of the panel is that really the Level 1 charging, there are outlets in most locations. I don't think we probably need to spend funds on Level 1 infrastructure at this point.

MR. KARNER: Just look for the Coke machines.

MR. MARKEL: Leslie, I'll turn it back over to you.

MS. BAROODY: Okay. Good job today. Really appreciate it. And thank you, Tony. You've done a great job as well. So now we're just going to open it up for public comment. We're not quite done. Hang in there. Public comment for general comments on the whole day or whatever comments.

So we've got one right here. And another there.

That's two. Oh, first we had on the WebEx wants to ask quickly and then we'd proceed with the other two. Go ahead.

MS. MAGANA: The question is from Julie Donoho. Her question is what about ADA access ability for charging stations?

MS. BAROODY: Is there somebody here that wants to talk about ADA? Dave, great.

MR. PARKER: The only thing we had was back in the 90s. And back in the '96, we asked the Department of Justice to clarify ADA requirements. So we have a paper on that, which I can get you, which it lays out in one page what you need to do and what you need to watch out for.

But I think, Bob, You were talking about I think we need to go back and readdress that issue. The explanation we have is not compete. Not complete enough for what we need to do going forward.

MS. BAROODY: So we'll do that for another workshop. Okay.

MR. HAYDEN: Just a quick word. There was a 1997 a draft guidance that was published by the State Architect's Office and DSG made it available for jurisdictions throughout California. It may or may not still be relevant and it's there. But the local

jurisdictions that have governance over ADA are free to interpret it definitely and are doing that and it is something that's going to be looked at jurisdiction by jurisdiction unless the state comes out with something more current. But there are issues to lack at there.

MS. BAROODY: Thanks, Bob. Okay. So that's. Dave, I think you were first.

MR. TULAUSKAS: Good afternoon. My name is David Tulauskas, and I work for General Motors. Alex had to leave early and he asked me to mention just one more time the Volt and range anxiety.

(Laughter)

MS. TULAUSKAS: Now seriously, just wanted to make a couple comments.

One, we talked a lot about the Nissan Leaf and Chevy Volt. But depending on which article you read, there is going to be 20 to 30 plug-in hybrid electric vehicles or just pure battery electric vehicles coming out over the next one and a half to 18 months and 24 months. This isn't just Nissan Leaf or BMW Mini E or Chevy Volt issue. There are a lot of cars coming to the market.

So this issue that we don't have to consider the buyers because they're going to buy these anyhow I think is going to quickly dissipate. The first 50,000 EVs that are going to be on the road in 2011, yes, they're

oversubscribed. But I think we're quickly going to see the market be very competitive. Prices are going to come down. And we're going to need -- incentives will be good, because we talked a lot about the societal benefits. But there are a lot of EVs and plug if hybrids coming on the road.

And another thing that when a customer -- we talked a lot about having to put the customer first. And again there are different numbers on this. But when a customer has a good experience, they generally tell five to eight people. When they have a bad experience, they generally tell 15 to 20 people. So it is important to keep the customer in mind and make sure they go through a good experience.

And I'm new to the area, new to this issue. But I was just thinking if AB 118 money is going to be available at about 100 million dollars for every year through 2016 if you just -- it sounds like there's kind of a lot of money out there. And every aspect whether it be residential, commercial, workplace or public charging is important. I think we all agree upon that. But where do you put the money. More importantly, when do you put that money where?

And just a thought I was thinking if you look at the usage chart of where the vehicles are going to be

charged at, at home initially, but may be over time that's going to change. Or the infrastructure requirements will change. So you know, 2011, you put 70 percent in residential, but by 2016, when you have that last amount of money, you switch 70 percent of that funning over to public or commercial. I don't think we have to really fight all at once for all of it at one time. Just something -- we should be taking a five-year look at this as opposed to one year look. Just a thought.

MR. VAN DEVENTER: My name is Peter Van Deventer. I work for the Dutch government. So it's odd I stand here. But just a brief comment.

I was here last year. So you could ask me the conscious question has anything changed? Yes, a lot has changed. I heard more discussion, more planning, but also more disagreement. And as far as I'm concerned, that's exactly what this process is asking. Good debate, good discussion and not knowing exactly where you're going, where you're heading.

In the Netherlands, I work doing the same kinds of things you're trying to achieve here. We have exactly the same problem, and I would suggest you continue doing this because that will give me a good opportunity to come back again next year. Thank you very much. Good luck.

By the way, I do have a paper if you want to read

it and it's on the public policy and the electrification of transportation. So give me a nudge if you want to have that.

MS. BAROODY: Thanks.

MS. COX: Good evening, everyone. I think we're very close to evening. My name is Barbara Cox. I'm with the Labor Management Cooperation Committee, with the National Electrical Contractors Association, and the International Brotherhood of Electrical Workers.

And one of the things I have not heard is any of discussion on the workforce needs as we're moving forward and also piggybacking on top of the existing rules and regulations that exist in California. We have the Department of Industrial Relations has State approval of apprenticeship programs. These already exist. IBEW, NECA sponsors -- almost completely privately sponsored 23 training centers throughout the state of California. This same program exists throughout the California in Canada.

The reason I say it's almost entirely is because there is a small amount of funding depending on the jurisdictions with linkages with either regional occupation programs when we call ROP or with our linkages with commute colleges. So this is a very, very low cost way to bring new workers into the workforce. California also requires that you complete a State-approved

apprenticeship program to sit for the State certification for electricians.

Again, these are existing regulations that we can roll in as we expand this market. And these are folks who are probably going to be your next phase of adopters of this technology. These are folks who are already interested. This is their career. And so be aware that there is a market there as well.

So I thank you. And I learned an amazing amount today and I really do thank all of the panelists for their very lively discussion today. Thank you.

HEARING OFFICER RENAUD: Thanks a lot.

MR. CALHOUN: Thank you again for inviting me. My name is Blair Calhoun. I work for a small company called Sun Spots. There were three things that I think needed to be broadened.

One was about the consumers of the cars themselves. Auto makers are going to differential there are sport cars. There are SUVs. There are high mileage/low mileage cars. I don't think we should be too hung up on the first few models that come out. There will be longer range models, shorter range models so the policy shouldn't be focused on the Volt or the Leaf. But just on the electric drive. The electric drive is the platform and the auto makers will come up with ways of using that

platform.

The second is I didn't like to see more talk about the integration of renewable energies with the EV infrastructure. Again, we want to go to a zero emission vehicle. That's really the goal. And you get to zero emission by actually having renewable energy, not using fossil fuels as your driver for electricity. And the big topic was how to use the public funds.

On Don's point, I break it down to five things. You have the home, residential public, as far as transit hubs, public as far as streets, commercial for private access like employers and the commercial for public access. I think as long as the word public is there, that's where the government should be putting its money. It shouldn't be benefiting employers for putting in charging station for their employees. It's a private use for private access. And for the home, maybe some tax incentives. But that one person gets the benefit from the home but the public doesn't. It's balancing the individual needs versus the community needs. I think the money should be going towards those things that are publicly accessed. Thank you.

MS. BAROODY: Thanks a lot.

Anybody else for public comment? Nope. We're going to open the lines, if anybody has somebody to say on

the WebEx.

I guess not. Well, 4:30. I'd say that's pretty good timing.

I just would like if Joshua Cunningham would like to say a few words, if he's still here. Is Joshua still here? He's gone. Okay.

Well, I think I'll just wrap it up then. I want to thank everybody for being here today. It's been a great day. We've had some questions answered and maybe we have more questions in the future. I think it was successful in that we gained a lot of insight for our guidance document that we'll be working on. And I think it's been very helpful for the statewide PEV cooperative. And so thanks again to the panelists and all the attendees.

Thanks to NRL, Tony Markel, appreciate your help today, and PUC staff for helping us out today. Have a good trip home. Thank you.

(Thereupon the workshop concluded at 4:30 p.m.)

CERTIFICATE OF REPORTER

I, TIFFANY C. KRAFT, a Certified Shorthand Reporter of the State of California, and Registered Professional Reporter, do hereby certify:

That I am a disinterested person herein; that the foregoing hearing was reported in shorthand by me, Tiffany C. Kraft, a Certified Shorthand Reporter of the State of California, and thereafter transcribed into typewriting.

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

IN WITNESS WHEREOF, I have hereunto set my hand this 29th day of October, 2010.

TIFFANY C. KRAFT, CSR, RPR
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