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1 P R O C E E D I N G S

2 9:00 A.M.

3 MS. BAROODY: Well, good morning everybody, sorry  
4 for the late start, it's just great to see you all here.  
5 Welcome to the Energy Commission's fifth in a series of  
6 workshops for the 2010-2011 Alternative and Renewable Fuel  
7 and Vehicle Technology Investment Plan.

8 We'd like to thank the California Public Utilities  
9 Commission for the use of this auditorium.

10 We really appreciate you taking the time to be  
11 here with us today and we welcome those of you listening  
12 online. We realize that this is a holiday for some of you,  
13 so appreciate your effort to be here.

14 Well, we've had some very successful and  
15 informative workshops in the past month and I really suspect  
16 today will be productive as well.

17 I'd like to introduce our team from the Emerging  
18 Fields and Technology Office of the Fuels and Transportation  
19 Division.

20 I'm Leslie Baroody, I'm Project Manager for the AB  
21 118 Investment Plan.

22 And Charles Smith, Assistant Project Manager.

23 Peter Ward and Tim Olson, they authored last  
24 year's investment plan and they're experts on alternative  
25 transportation fuels and technologies.

1           Ysbrand van der Werf, he's our electric  
2 infrastructure. Oh, is he here? No, he's not here yet.  
3 Anyway, he's our GRET model expert and electric  
4 infrastructure expert.

5           John Margolis is our electric field -- electric  
6 vehicle expert.

7           And Charles Smith and Miles Robert will be  
8 assisting us today with the WebEx and the Power Point  
9 presentation.

10           So this meeting is on WebEx and the transcript and  
11 audio will be posted online, it will be online for a long  
12 time.

13           Well, the main purpose of today's workshop is for  
14 the Energy Commission staff to acquire information needed to  
15 provide the basis for allocating \$100 million in AB 118  
16 funds. We need updated information and insights on electric  
17 charge infrastructure, including technology status,  
18 installation location, capital costs, customer demand,  
19 market potential and the role of utilities with regard to  
20 electric drive transportation.

21           This workshop is the beginning of a data  
22 collection process. We will continue with a review of  
23 docketed materials, subsequent dialogue and additional  
24 input.

25           As you can see, we have a full agenda today, we

1 have ten panelists to speak this morning. We want to allow  
2 time, also, for public comments for those in the audience  
3 and on WebEx.

4 Our introductory speakers will be Peter Ward, who  
5 will provide an overview of the AB 118 Investment Plan  
6 process and we'd like to also welcome CPUC Commissioner  
7 Chong, she'll provide an overview of the CPUC's OIR.

8 A little bit later then we'll have our  
9 Infrastructure and Vehicle Charging Panel. We're going to  
10 try to break for lunch at 12:30.

11 After lunch, at 1:30, we'll resume with the  
12 Utilities Panel, followed by the public comment session at  
13 3:30, and if all goes well we should be adjourning by four  
14 o'clock.

15 As I mentioned before, this is the fifth in a  
16 series of workshops that we've conducted over the last  
17 month. This slide here shows the workshops that we have  
18 conducted, electric drive, biofuels, natural gas, propane,  
19 hydrogen, and then today's workshop.

20 So the next step in this investment plan process  
21 is for staff to analyze and incorporate all the information  
22 that we've gathered at these workshops.

23 We plan to produce a draft of the investment plan  
24 just in time for our first Advisory Committee meeting, which  
25 should be in mid-November.

1           We'll then have two more public workshops for the  
2 draft investment plan, followed by another Advisory  
3 Committee meeting in December. And we hope to have the  
4 final draft probably in January.

5           So if you're not already on our list serve, I  
6 encourage you to sign up on our webpage. It's on the bottom  
7 right-hand corner, under AB 118 Investment Plan.

8           So thank you very much and I'd like to introduce  
9 Peter Ward.

10           MR. WARD: Good morning everybody, thank you for  
11 coming.

12           As Leslie said, this is the fifth in a series of  
13 five workshops we're having for the next year's investment  
14 plan and we're here serving two purposes; this is an awfully  
15 nice meeting room, but it's also very germane to the  
16 proceedings that the CPUC is holding on this topic, and so  
17 we thought it might be best to come right to this point to  
18 bring this issue to everyone since we're working on it and  
19 the PUC is working on it.

20           We're happy that you're all here. Also want to  
21 say hello to everybody who's on the WebEx out there and  
22 we're not forgetting you. You're not in the room, but we  
23 definitely appreciate you attending as well.

24           This year's investment plan will be a little  
25 different from the last one. The first one we did was

1 pretty much groundbreaking, that was the first one. This  
2 one will be more of an update from that investment plan last  
3 year, and we have quite a schedule to meet; both at the same  
4 time we are doing this investment plan we are preparing  
5 solicitations that will be going out quite soon and I will  
6 be speaking a little more about that later.

7 This is California, after all, the nation State of  
8 California. I think I would be remiss if I didn't point out  
9 how big of an issue this is by virtue of the size of our  
10 State, 36, nearly 37 million people, a GDP of 1.8 trillion.  
11 You know, we're nearing the eighth largest economy.

12 (Off-record conversation regarding WebEx.)

13 MR. WARD: Okay, I think we're all set to go  
14 again. Along with all the good things of --

15 (Off-record conversation regarding WebEx.)

16 MR. WARD: As I was saying, California is a very  
17 big state and it has very -- we have a very big problem, or  
18 a few, but those are opportunities; right?

19 So when we're the eighth largest economy,  
20 depending on the inclination of the French, we're the  
21 seventh, or eighth or ninth, but nevertheless as a State  
22 that's very large. We have about 7.2 percent -- this is  
23 good, we're having commercials, too. Information on solar,  
24 another number.

25 (Laughter.)

1           MR. WARD: Our problem for California, in GHG, is  
2 relative to our large economy as well. We have 7.2 percent  
3 of U.S. emissions, we're the largest emitter on a global  
4 scale and transportation accounts for 38 percent of all the  
5 GHG emissions in California.

6           Transportation is key in the nation, it's a little  
7 bit different representation insofar as our grid is a little  
8 bit cleaner than the national grid on average, so most our  
9 GHG comes from transportation and not from electricity  
10 generation.

11           We have 26 million vehicles -- or 26 million cars  
12 and about a million trucks on the road. Our annual fuel  
13 consumption which, to me, has always been a staggering  
14 number, about 20 billion gallons a year, that's over a  
15 billion and a half gallons a month and many other states  
16 are, you know, one-tenth of that.

17           We have 16 billion gallons of gasoline, four  
18 billion gallons of diesel, and we're the third largest  
19 consumer of vehicle fuels after China and the U.S.,  
20 respectively, so we take our -- we take our spot as a nation  
21 state.

22           In December 2007 the Air Resources Board and the  
23 Energy Commission adopted the Alternative Fuels Plan which  
24 put into effect our capability of being able to meet the  
25 goals that were established in AB 2076, reducing

1 California's petroleum dependency.

2           We called for in that a 20 percent reduction -- or  
3 a 15 percent reduction in petroleum reduction, 20 percent  
4 use of alternative fuels in 2020, 30 percent in 2030. And  
5 in this plan we found that under a moderate development  
6 scenario we could meet those, and we further delineated  
7 those goals to nine percent in 2012, 11 percent in 2017, and  
8 26 percent in 2022.

9           The principal author for the Alternative Fuels  
10 Plan was Tim Olson, he's up at the dias and he can, believe  
11 me, answer any questions you might have on that. He was --  
12 did a very deep dive in that and it's an excellent piece of  
13 work and charts our future for displacing petroleum as we go  
14 forward.

15           Obviously, this program can have a dramatic effect  
16 on how we actually do that. We set the goals under a  
17 moderate development scenario and with this program that  
18 we're about today is providing the funding to achieve those  
19 goals.

20           We know that electric drive vehicles can make an  
21 important contribution to this goal, corresponding  
22 reductions of GHG and the air pollution.

23           Key policy objectives here are GHG reduction, that  
24 is the main purpose, established by statute, of our program  
25 to reduce GHG emission to 1990 levels by 2020, as called for

1 in AB 32, and 80 percent below 1990 levels by the year 2050,  
2 as called for in the Executive Order by Governor  
3 Schwarzenegger.

4 Petroleum reduction, as I mentioned, reduce 15  
5 percent below 2003 levels by 2020.

6 Alternative fuels, increase to 20 percent of on-  
7 road fuel demand by 2020, 30 percent by 2030. Those are  
8 very aggressive goals. Did a calculation a year or two ago  
9 and that would be adding about one million gallons of  
10 alternative fuels per day into commerce in California. I  
11 think we are a little bit behind our track for that right  
12 now so, hopefully, this program will help us catch up.

13 Biofuels use, established in the Bioenergy Action  
14 Plan and the Executive Order by the Governor, to increase  
15 biofuels use to one billion gasoline gallon equivalents by  
16 next year, and 1.6 billion gasoline gallon equivalents by  
17 2020, two billion by 2050.

18 Also part of that, of those goals is to have those  
19 biofuels produced in California at 20 percent of biofuels by  
20 2020 -- by 2010, 40 by 2020, and 75 percent by 2050.

21 Those are all the key policy objectives and  
22 drivers for this bill and for our program, and we think that  
23 the funding that we receive gives us a good jump start to  
24 achieve these.

25 For every dollar we spend in this program we can,

1 I feel, improve many public benefits at the same time and  
2 with the same dollar.

3           The Alternative and Renewable Fuel and Vehicle  
4 Technology Program was established by Assembly Bill 118, by  
5 then Speaker Fabian Nunez, subsequently amended by AB 109,  
6 also by Speaker Nunez.

7           And here is the emphasis of the program and the  
8 purpose is to help us develop and deploy innovative  
9 technologies that transform California's fuels and vehicle  
10 types to help attain the State's climate change policies.

11           The funding for the program is up to \$100 million  
12 per year for seven and a half years; \$75 million as  
13 allocated in '08-'09, \$101 million for '09-'10, and this  
14 next year we're thinking the amount could be about \$100  
15 million, we're hoping.

16           We're also -- we've been hoping to capture the  
17 funding that was not allocated in the early years to bring  
18 it into the third year.

19           This is to develop, produce, manufacture and  
20 deploy alternative renewable fuels, advanced technologies,  
21 vehicle efficiency improvements for on-road and non-road  
22 applications.

23           Establish workforce training and job creation,  
24 foster education, promotion and technology centers of  
25 excellence.

1           And throughout this we'll be preparing  
2 environmental, market and technology assessments as we go to  
3 make sure that this program is informed year to year, so we  
4 can actually make the best decisions going forward from the  
5 allocations of our funding, and so that we're leaning  
6 forward for the next best things in transportation that  
7 develop.

8           State and Federal policies to reduce GHGs will  
9 increase demand for alternative fuels. As I mentioned, AB  
10 32 and its goals, the California low carbon fuel standard,  
11 that's a ten percent reduction, carbon intensity of  
12 transportation fuels by the year 2020.

13           We feel that many of the alternative fuels, if not  
14 all of the alternative fuels deployed are around, at  
15 minimum, 20 percent lower carbon right now, early, and  
16 surplus, too, the regulation's taking effect in a gradual  
17 manner from 2010 onto to 2020.

18           And, of course, the Fuels Standards I and II will  
19 have an effect on our program and we're hoping that  
20 developing more -- less carbon-intensive supplies of ethanol  
21 will be key to that program as well.

22           First investment plan allocations, this is for the  
23 two years, as you can see. Electric drive, an allocation of  
24 46 million, hydrogen 40, ethanol 12, renewable  
25 diesel/biodiesel six, natural gas 43, propane two million,

1 and the market development and program support at 27  
2 million.

3 As I mentioned, we do hope to inform this program  
4 as we go forward and that both is in the market assessment  
5 and the environmental assessment, both for GHG and criteria  
6 emissions for all the alternative fuels and for the program  
7 as we go forward.

8 A sizeable amount of that money, the market  
9 development program support, has already been allocated to  
10 workforce training efforts in California.

11 Since this program was established and signed into  
12 law by the Governor, the importance of economy development  
13 has risen to the top; I think we will all agree with that.

14 We're hoping that this program is an excellent  
15 vehicle, pun intended, to provide economic development for  
16 the State of California.

17 Previous electric drive funding allocation  
18 summary; this is a breakdown of the, again, 46 million that  
19 I mentioned.

20 Plug-in hybrid electric passenger vehicle  
21 retrofits, three and a half million, medium- and heavy-duty  
22 hybrid vehicle RD&D ten million, non-road deployment  
23 projects for ports and truck stop electrification, 11.5  
24 million, charging stations 12 million, manufacturing  
25 facilities and equipment nine million.

1           That last category is funding that we have that is  
2 available and it is real, and we were hoping that we would  
3 be able to provide the required match share for the Federal  
4 stimulus funding and in that particular category there was  
5 \$2 billion available from the Department of Energy.

6           And, unfortunately, we got skunked in that  
7 particular category and we received zero funding from the OE  
8 in this area. I'd like to say that we are ready, willing  
9 and able to work with the manufacturing and production of  
10 batteries and vehicle components in California, we think  
11 that's a very high priority at the Energy Commission and  
12 we'd like to work with those folks who are planning  
13 expansions or relocations into California for manufacturing.

14           Our next steps are the ongoing evaluation of some  
15 of the proposals for the Federal economic stimulus, though  
16 most of those awards have been announced. The biorefineries  
17 has not been and the ARPA-E solicitation has not been  
18 announced yet.

19           So we do have some talk-share letters of intent in  
20 those and so we are still evaluating those proposals and are  
21 waiting to hear which of those projects we have been awarded  
22 funds for California.

23           And as you know, this is the update of the 2010-  
24 2011 Investment Plan and that's the business we're about  
25 here today, and will be over the next several months, as

1 we're hoping to go to draft for this, appoint a new Advisory  
2 Committee for our Investment Plan process, which is required  
3 by statute, hold at least two public Advisory Committee  
4 meetings on this next investment plan and, hopefully, adopt  
5 it in the spring and take it into the budget season, which  
6 is always an interesting, if unpredictable process in  
7 California.

8           So I want to thank you all again for attending and  
9 look forward to all the interaction, discussion, and your  
10 ideas, which is basically why we're here, we want to hear  
11 from all of you if we can.

12           Our docket is open until the end of -- near the  
13 end of this month and when you submit to the docket we do  
14 read it, we do take it to heart.

15           So thanks again for coming, we look forward to  
16 productive day today. Thank you.

17           (Applause.)

18           MS. BAROODY: Thank you, Peter. Now I'd like to  
19 welcome Commissioner Chong.

20           COMMISSIONER CHONG: Okay. So welcome to San  
21 Francisco and on behalf of the Public Utilities Commission,  
22 we are very happy to host the room for this excellent event.

23           I do apologize that I have been called away  
24 elsewhere, otherwise I would have been here all day. I'm  
25 very sorry to miss the rest of the day, but I have left Matt

1 Crosby, who is hiding in the corner over there, just wave,  
2 Matt. He is the yeoman on the EV proceeding for me and he  
3 is going to give me the full report at the end of the day.

4           So I've been asked to talk quickly about the new  
5 rulemaking that the PUC has started on electric- and  
6 alternative-fueled vehicles. We put it out on August 20<sup>th</sup>,  
7 and our primary focus is on electric vehicles, but we are  
8 looking at natural gas vehicles, too.

9           And I wanted to just give you a brief overview of  
10 the rulemaking and I am going to highlight some areas where  
11 I hope that stakeholders, local governments, State agencies,  
12 and others can collaborate on.

13           I would strongly encourage everybody to get  
14 involved in our rulemaking, we have a lot of critically  
15 important issues that we'll be looking at and I really want  
16 everybody to get involved; so please consider it.

17           So as background, back in May the Commission's  
18 Policy and Planning Division issues a white paper on  
19 electric transportation, and you've just met the main  
20 author, which was Matt Crosby over there.

21           And then in July, mid-summer, we held just a  
22 packed proceeding in this very room, where a number of you  
23 were there, on electric vehicles and alternative-fueled  
24 vehicles. Really, we had to focus that down electric  
25 vehicles.

1           And it was just a great day, we brought in the  
2 automakers, we brought in the utilities, we brought in the  
3 independent charging companies, and environmental groups,  
4 and electric vehicle owners. And I think what we ended up  
5 with was a very -- a great mix of opinions and a lot of  
6 substantive information from which this Commission learned a  
7 lot. So I wanted to thank everybody that came.

8           And so we have a lot of momentum going here at the  
9 PUC. I'm pushing that momentum because I think this issue  
10 is extraordinarily urgent. I think California can take the  
11 lead in this area, we have taken the lead and we need to  
12 take the lead again.

13           And so under the leadership of Mike Peevey and  
14 myself there's a lot of action here at the PUC pushing  
15 forward as quickly as we can.

16           Now, the thing that impressed me the most from all  
17 of these activities is the idea that EVs are coming really  
18 soon. I didn't know before the July workshop how many  
19 electric vehicle models are headed to our roads and easily  
20 there's 10 to 15 that are expected to enter the California  
21 market by 2015.

22           And frankly, there's an expectation that  
23 California, and particularly the Bay Area, may well be the  
24 launching grounds for these vehicles because we are a place  
25 that's very concerned about the environment and we have all

1 these regulatory and legal mandates that were so nicely  
2 reviewed by Peter, prior to me.

3           So we are also concerned, of course, here at the  
4 PUC about the amount of greenhouse gas emissions that are  
5 caused by non-electric vehicles, fossil fuel, and so we are  
6 also working on reducing emissions generally, along with our  
7 other colleagues and State agencies because of AB 32, so  
8 we're worried about that.

9           The other more specific issue is that electric  
10 vehicles represent, can represent a significant load for the  
11 electric grid and it's been pointed out to us in the  
12 workshop that when you have a cluster of electric vehicles  
13 in a neighborhood that it can represent a lot of strain on a  
14 particular transformer. So we have concerns about what will  
15 happen to the distribution infrastructure, in particular  
16 neighborhoods where you see clusters, and you do see  
17 clusters.

18           We had one fellow come in and show us that there's  
19 clusters in places like Berkeley, San Francisco, Marin, you  
20 know, no big surprise there.

21           But this is a real problem so we do need to make  
22 sure that our distribution infrastructure is ready for the  
23 additional load that will be posed by electrical vehicles.

24           It is extremely important that there are no  
25 adverse impacts on the grid. No one is happy when the power

1 goes out.

2           So there's a big potential for alternative  
3 vehicles to cut greenhouse gas emissions and we have to  
4 manage the impact of these vehicles on our electric system  
5 and this is why the PUC started our rulemaking.

6           The next two slides is going to give you a taste  
7 of some of the issues that the PUC is going to be looking  
8 at. More detail can be found in our Order Instituting  
9 Rulemaking, which we call an OIR, just to introduce you to  
10 the acronyms over here.

11           Well, obviously, EVs are not going to be  
12 successful unless people can easily refuel them and it has  
13 to be very convenient for them. So we need to have charging  
14 infrastructure not only at home, which is the most  
15 convenient place for them to charge, but also at their  
16 workplace, which is the second most convenient place for  
17 them to charge.

18           And also it's been pointed out to me that you need  
19 to have a fair number of charging infrastructure out in  
20 public because of the range anxiety that people feel. In  
21 fact, we had a couple of executives from Tokyo Electric  
22 Power Company come a couple weeks ago and meet with the Gov-  
23 to-Gov Group and the PUC, and he made this point very firmly  
24 that until they had put out more public charging  
25 infrastructure points for his workers, who were driving

1 electric vehicles, he couldn't get them to drive very far.  
2 But as soon as he put out more of them suddenly they were  
3 driving all over the place. And so I think it's a  
4 psychological impact of having those out there and I thought  
5 that was very, very interesting.

6           So we are looking into some issues relating to  
7 development of infrastructure including the role of  
8 utilities and third-party charging infrastructure  
9 developers.

10           We also have to make sure that we have the  
11 appropriate rates in place. If owners charge their electric  
12 vehicles on summer afternoons, the utility has to purchase  
13 higher-priced power, which are generated by more inefficient  
14 power plants and in some cases it could threaten the  
15 reliability of the whole electric system.

16           Conversely, at other times, principally nighttime,  
17 power is cheaper and it would obviously be a better time for  
18 electric vehicles to be charged for the impact on the grid.

19           So one way is to give vehicle owners an incentive  
20 to charge at the best times through time variant rates, so  
21 it would be more expensive to charge in the afternoons and  
22 less expensive on nights and weekends, early mornings for  
23 example.

24           So the utilities, they've already got time-of-use  
25 rates for electric and natural gas vehicles, and we are

1 intending to review those rates and see if we need to  
2 develop new rates.

3           We also are looking at whether incentives  
4 are appropriate for fueling infrastructure or vehicles. One  
5 thing that's important is that we have to set up a level  
6 playing field for transportation fuels and technologies.  
7 The PUC is also going to be looking into some important  
8 legal issues that could affect infrastructure development  
9 and rates.

10           So for example, our third-party electric vehicle  
11 service providers, electric companies. How fun will that  
12 be?

13           (Laughter.)

14           COMMISSIONER CHONG: So there's a couple ways to  
15 get involved in our proceeding and, again, I really wish  
16 that you would. We had opening comments already due October  
17 5<sup>th</sup>, but if you missed it, not to worry. You can also look  
18 at the comments that were filed and file reply comments,  
19 which are due November 6<sup>th</sup>, so there's still plenty of time.

20           It is also likely that we're going to be holding  
21 some live workshops at the PUC on a few issues.

22           Matt, I don't think we've scheduled any yet; have  
23 we, firmly? Soon. Okay, he says soon. I know they've been  
24 looking through my calendar recently so I know it's soon.

25           We're looking, I think generally, at kind of

1 December to February; is that my understanding?

2           Okay, so watch the website page, which I'm about  
3 to give you, on the proceeding for announcements of  
4 workshops. And the other way you can do it is you can put  
5 your e-mail onto our service list, there's an informational  
6 service list and one for the parties, to notified of any  
7 action in the proceeding.

8           Matt can help you get on the service list. If you  
9 give him your card today and tell him you want to get on, he  
10 will happily gather that and get that over to our judge.

11           So there at the top is our Alternative Fuel  
12 Vehicle webpage, where you can track what's going on.

13           Hey, Matt, we've got to get a better landing site,  
14 that's too complicated. Talk to Terry about that, we need  
15 something really easy.

16           And then the three people probably working the  
17 most on this here, at the PUC, is myself, Matt, who you just  
18 met, and my Senior Energy Advisor, Andy Campbell, who's  
19 returning from vacation today otherwise he would have been  
20 here, but he's also working a lot on it.

21           So thank you for having me today and I do  
22 apologize that I need to run for my next appointment, but  
23 thank you for having me. Take care.

24           (Applause.)

25           MS. BAROODY: Okay, I think we need to load up a

1 few presentations, take about five minutes.

2 (Off the record.)

3 MS. BARODY: Here we go. I'd like to introduce  
4 Richard Lowenthal, with Coloumb Technologies. Thank you.

5 MR. LOWENTHAL: How's that? Wow, it worked.  
6 Okay, thanks very much.

7 You know, I wrote this presentation to address  
8 your questions, but we'll be here a very long time if I do  
9 all that, so I'm going to have to push forward kind of  
10 quickly.

11 (Technical delay.)

12 MR. LOWENTHAL: Okay, so I'm going to move quickly  
13 because I know we're behind. So we started two years ago,  
14 we make network charging stations and a suite of software to  
15 operate them.

16 We starting shipping, our first customer was the  
17 City of San Jose, we opened our network in San Jose to the  
18 public in January of this year.

19 So we sell charging stations, level I, level IIs,  
20 some dual, a lot of dual. We are more focused on charging  
21 stations outside the residence, so for apartments and  
22 condominiums, for curbside, for places like that. You know,  
23 in San Francisco half of the cars park curbside at night, so  
24 we want to make sure the people in San Francisco can by EVs.

25 We are working on a DC charging product, which we

1 will do by integrating with a supplier of DC charging  
2 technology.

3           But the real focus at Coloumb is more on software  
4 than hardware. We have a billing system, we have an AMI  
5 integration product, we have Smart Grid integration tools,  
6 including demand response, an integration with Grid Point  
7 Software, and the ability to implement utility incentive  
8 pricing programs.

9           We have a fleet management product, so that if you  
10 own a fleet of EVs, let's say you're Hertz rent-a-car and  
11 you want to know when your cars are ready to go, we tell you  
12 that. And if when they return the car they don't plug it  
13 in, we tell you that, and lots of statistics about the  
14 fleet.

15           Remote station management is a big thing for us,  
16 where we are trying to have very high up-time by monitoring  
17 all of the stations 24 hours a day. So we always know the  
18 health of the station, we report it on your Blackberry. So  
19 if before you go to a station and you want to know if it's  
20 available, that is somebody's charging or not, and if it's  
21 working you find out on your Blackberry before you drive  
22 there to plug in.

23           And then we have driver charging assistance, we  
24 found that to be very important. For instance here, in San  
25 Francisco, we've got some stations at city hall. The ZIP

1 car guys are the most fun because there's a new driver every  
2 day of EVs, that's never plugged in anything before,  
3 apparently, so they frequently call our 800 number on the  
4 station and we can operate the station from our data center  
5 and things like that.

6 I did the evil pushing the down button again, I  
7 got a -- I could talk about this one for a long time, if you  
8 want. That's good. So whatever slide comes up, I'm talking  
9 about it.

10 So we are selling now worldwide. We sell more  
11 outside the United States than inside. The breakdown is 37  
12 percent to counties and cities, 39 percent to businesses, 22  
13 percent to utilities, and two percent to automakers. That's  
14 because the automakers aren't shipping many cars yet, we  
15 expect that to grow. And then we expect the utility segment  
16 to grow a lot.

17 Because ultimately, you know, we see whole  
18 countries where the business will be entirely utility  
19 business, and then they just use our billing system to  
20 charge people by kilowatt hour, whereas in the U.S. most  
21 places we're not doing that.

22 But we expect the utility segment to be our  
23 largest customer in the long haul.

24 I'm going to try the down button. Amazing. So  
25 here are some places where we have stations. Of course, a

1 lot in California, but our biggest single customer is in  
2 Amsterdam, the City of Amsterdam has 33 stations there now,  
3 they're reordering another 65.

4           The European countries are a little bit ahead.  
5 The Kyoto Protocol has pushed them ahead, much like many of  
6 the -- much of the legislation here, AB 32, and low carbon  
7 fuel standard is going to do here. They've been working on  
8 it a little longer there.

9           But also we have a lot of business in interesting  
10 places like McDonald's, and Apple Computer, Starwood Hotels,  
11 Ace Parking, a lot of private business where they're using  
12 it primarily as a marketing tool to bring customers in from  
13 their competitors.

14           (Technical difficulties.)

15           MR. LOWENTHAL: If you want to find these stations  
16 you can go onto our website, you can see all of our stations  
17 worldwide by going onto our website, and you can see which  
18 ones are in use because they're color coded blue on our map  
19 when somebody's actually charging, and green if they're  
20 available, red if they're broken. We hope for no reds.

21           In Ireland, as an example, they've decided this is  
22 an all utility business, all charging. So yes, they need  
23 strong asset management, so we give them all of that.

24           MS. BAROODY: Excuse me, Richard, would you mind  
25 just speaking into the mike so our --

1 MR. LOWENTHAL: Yes, sorry. I'm sorry.

2 MS. BAROODY: Thanks.

3 MR. LOWENTHAL: Was this the next one? I'm asking  
4 a lot now for specific slides. Okay, good. Yeah, we've  
5 done that one. All right, good, it looks like we're a  
6 little better off now.

7 Okay, so some things we think about EVSE, that is  
8 the supply equipment for electric vehicles, we think that  
9 they should support level I, because we think electric motor  
10 scooters, and motorcycles, and these conversion Prius's,  
11 there are a lot of vehicles where level I is adequate and  
12 certainly is more available.

13 You know, the basic rule on all these cars at this  
14 point, or all these vehicles is they need to charge in four  
15 hours, so they charge while you sleep or work, and for many  
16 times level I's adequate.

17 Must be compliant to UL standards. That's written  
18 carefully. You know, we are a little concerned that people  
19 should be able to accept any of the national testing labs,  
20 which is the letter of the law, but they should all be  
21 tested to UL standards.

22 Other things that we believe in, that everyone  
23 should have remote monitoring. You know, the stations that  
24 we have out there, basically left over from the trial of ten  
25 years ago, many of them don't work, some say most of them

1 don't work, but primarily you can't tell if they're working  
2 until you drive up and plug in. So we believe remote  
3 monitoring and maintenance is important.

4           Talked about some of these other things. We also  
5 believe that anybody should be able to charge at any EVSE,  
6 so although we have these billing systems we also will  
7 charge any vehicle that comes to one of our stations.  
8 There's an 800 number on there, if you want to authorize,  
9 you call that 800 number and the station will operate.

10           We also believe every station should have at least  
11 demand response, but further we think that energy  
12 forecasting and all that should come back to the utility  
13 from the stations.

14           And we feel very strongly, the bottom one, that a  
15 station owner should have the option of charging for use of  
16 the station. That's for places like these businesses where  
17 they want to recoup their cost of electricity and  
18 maintenance.

19           The situation where we had with stations of ten  
20 years, where there was nobody paying for maintenance, led to  
21 a very bad situation ultimately, where they all fell into  
22 disrepair.

23           And so we find that there are a lot of our  
24 customers that don't care about billing, then there are a  
25 lot of them that do, where they want to get at least their

1 cost of maintenance and electricity covered.

2           You asked about costs. They vary so much. You  
3 know, an indoor home station can be a thousand dollars; an  
4 outdoor, fancy station can be \$4,000. We have ones that  
5 have a combination of level I and level II, so it's a little  
6 hard to pin it down, and installation varies even more.

7           We tend to use an average of \$5,000 for EVSE and  
8 installation in the broad scope of things.

9           In looking at ways that the CEC may want to  
10 provide funding, you may want to do less than the full  
11 amount. We've found many of our customers self-install, so  
12 you don't really need to cover for the cost of installation  
13 always.

14           Many times the cities use their public works  
15 departments to do an installation.

16           So the CEC may want to go to sort of a match in  
17 some cases, where they provide funding for the station, but  
18 not the installation, which will stretch the dollars. And  
19 in fact we see that many of our customers prefer to do their  
20 own installation.

21           We also think it's a very, it's low-hanging fruit  
22 to either go out there and either upgrade or supplement the  
23 existing charging infrastructure in California, because the  
24 highest cost item, generally speaking, is bringing  
25 electricity to the site, and so we'd like to see the CEC

1 focus there.

2           So this is our specific proposal. We think every  
3 city should have stations. You know, I wasn't able to drive  
4 my Mini E here today because my Mini E, in reality, gets  
5 about a 90-mile range, and I'm about 50 miles away, and  
6 there's no Mini E station, so we'd love to have David  
7 Packerd install one here at city hall.

8           But we really need cities to have stations because  
9 in a metropolitan area, like the San Francisco Bay Area, a  
10 BEV is nearly useless for getting around town.

11           So the idea, which is promulgated often, that all  
12 you need is home charging, at least for an area like the Bay  
13 Area is inaccurate, because I couldn't drive my Mini today,  
14 and I drove my V8 Mercedes up here today. So there's my  
15 alternative, not good.

16           So we would like to see every city in the State  
17 have stations. We think that will cost the CEC funding  
18 process 12 and a half million dollars.

19           This is basically what we proposed to the DOE and  
20 we were turned down, like many projects in California, but  
21 we still think it's a good idea.

22           And we also think that concentrations of EV-  
23 readiness only in progressive cities like San Francisco and  
24 San Jose, Walnut Creek and others is not the way to go, we  
25 think it should be driven more by the public, and the public

1 wants to be able to buy a car anywhere in California.

2           So the one, two, three, four, fifth bullet down,  
3 most cars will at three kilowatts or six kilowatts, meaning  
4 that if you charge your car for an hour, you get 15 or 30  
5 more miles.

6           There's been a lot of talk about focusing on  
7 highways, so it doesn't really work very well for level I  
8 and level II charging to focus on highways. We'd much  
9 rather see a focus on metropolitan areas where you tend to  
10 leave the car for longer than an hour. And who wants to  
11 wait at a rest stop for an hour, anyway, on the freeway?  
12 So we would like to see more of an urban focus.

13           We also think, as I think it was Rochelle Chong,  
14 Commissioner Chong spoke about, is that the availability and  
15 seeing charging infrastructure will indeed, by itself,  
16 increase the EV acceptance, consumer acceptance.

17           And putting them in front of cities, in cities,  
18 like in front of city hall here, in San Francisco, we think  
19 will have a big impact on people's willingness to buy these  
20 cars.

21           And finally, don't forget the bottom bullet, in  
22 San Francisco there are six times as many cars as garages.  
23 Most people here cannot buy an EV if we don't have some  
24 infrastructure outside the home garage.

25           Many of those people will -- are happy to park at

1 work, by the way, or charge at work. So that's the way I  
2 charge, I charge exclusively at work, not at home, because  
3 it's difficult for me to put an EV level II charging station  
4 at my home.

5           The other area we'd like to see the CEC put some  
6 focus is on helping us with readiness. There are three  
7 particular issues that we'd like to see a focus on. One is  
8 a model ordinance; that is creating an ordinance that cities  
9 throughout other jurisdictions, throughout California could  
10 adopt, that would allow for one-day installation of EVSE.

11           When I bought my mini, it took a month to get a  
12 charging station in my home, in my home in Santa Barbara,  
13 which is a little long.

14           I mean, I come -- I get this car and I'm all  
15 exciting to drive it, and with a mini you can only drive it  
16 every other day if you don't have EVSE at home, so that's  
17 not so hot.

18           And so we want to see self-permitting. We  
19 basically would like to see a program where the governing  
20 agencies, the permitting agencies certify electricians to be  
21 able to do permitting and inspection so that they can do all  
22 of this in one day. So you buy a car and the next day one  
23 of us gives you a call and we go install in your home.

24           Otherwise, the whole impulse buying of the car  
25 market is going to get fouled up by this, so we really think

1 we need that ordinance.

2 Another ordinance we think we need is one that  
3 mimics what they did in Vancouver, Vancouver, British  
4 Columbia, which requires EVSE wiring in all new garages.  
5 That will reduce the cost of installation by two-thirds when  
6 they do decide to put in a charging station, and cost very  
7 little at the time of the construction of the garage.

8 So we would love to see the CEC fund the  
9 development of these ordinances. We're not asking for that  
10 money, but we sure would love to have these ordinances.

11 The third one is to figure out how to allocate  
12 space. So I have an apartment building here, in San  
13 Francisco, I can't get a charging station anywhere near my  
14 apartment building. My apartment building has six units and  
15 one garage and it is very difficult for a city to figure out  
16 how to allocate a public parking space for EVSE.

17 So these are three areas where we would love to  
18 see a project funded by the CEC to get some ordinances that  
19 can be adopted throughout the State.

20 Growth, we expect California will have 100,000  
21 PEVs by 2012. Each one needs two places to charge; one  
22 where you sleep, which is different than the home garage, we  
23 believe, and one where you work, and so we're going to need  
24 a lot of EVSE in California.

25 Oh, now I've reached the limit of computer. I

1 know, there's probably nothing important after this. I  
2 don't even know what there is.

3           So anyway, we would really like to see these model  
4 ordinances happening, we think that will be wonderfully  
5 effective at growing this market. We would like to see  
6 people who want to charge, for people fueling their cars to  
7 be able to charge for fueling their cars. We want every  
8 station to be able to charge anybody's car. And so I'll  
9 charge Sven's car, he'll charge our cars, everybody's happy.  
10 I think those are the big points.

11           Are you done or you think it will work? I got  
12 hour glasses. You know, I think that's enough, thanks very  
13 much.

14           MS. BAROODY: Thank you.

15           (Applause.)

16           MS. BAROODY: Thank you very much and thanks for  
17 your patience.

18           Do you have any questions for Richard?

19           MR. OLSON: Yeah, one question, Richard, this is  
20 Tim Olson for the record here, on your estimate of 100,000  
21 plug-ins by 2012 --

22           MR. LOWENTHAL: Right.

23           MR. OLSON: -- how do you derive that? Is that  
24 based on automaker or I guess we want to know more about how  
25 you're -- where you're getting information to estimate the

1 number of stations and how reliable is that data?

2 MR. LOWENTHAL: I don't think it's tremendously  
3 reliable. It's not really our data, it's data that we've  
4 borrowed from -- there's a couple of reasonably good  
5 reports, there's the Morgan Stanley report of a year ago,  
6 that's where that number came from. It talked about 200,000  
7 in the U.S. and we think California will have the first  
8 half.

9 And then there's the Pike Research Report that  
10 goes into all of this in some detail.

11 So we don't actually try to do this. When we look  
12 at how to roll out stations, we follow the cars. And  
13 everybody needs a place to charge when they're sleeping, we  
14 think, and according to UC Davis, 80 percent of people want  
15 to charge twice a day. So that's the -- we use 1.8 times  
16 the number of cars as the bare minimum. If every station  
17 was busy, you want 1.8 times the number of cars. And then  
18 cars we've picked up from these industry reports.

19 MR. OLSON: And you're recommending metropolitan  
20 kind of cluster installations. Any preferential areas,  
21 regions that you would do things first?

22 MR. LOWENTHAL: Well, you know, obviously the Bay  
23 Area is progressive and getting -- making the Bay Area work  
24 would be great. It doesn't matter. I can bring my plug-in  
25 Prius anywhere in the Bay Area now because we know where we

1 can charge those, and you can -- I think you can get by with  
2 a Rabbit IV still, because we know where we can charge  
3 those, but we need at least that equivalent for J1772  
4 vehicles.

5           So I would start here. And the same way with  
6 L.A., L.A.'s a wonderful area, but you've got the same  
7 problem where the distances are relatively big in  
8 California, 50 miles is not unusual to drive in a day. I do  
9 it most days. Not for my commute, but because the Bay Area  
10 is a metropolitan region where we spend our time. So that's  
11 what we'd like to see.

12           But really, we believe every city should have some  
13 because it's about enabling people to buy the cars, and it  
14 doesn't take very man, three or five in a city is enough to  
15 awaken the market, we think.

16           MR. OLSON: And with your -- your plan is on  
17 installing these charge stations, charge points; is there --  
18 will there be a conflict if passenger vehicles -- can  
19 passenger vehicles charge at the same point as a truck, or a  
20 bus or --

21           MR. LOWENTHAL: We certainly think so. So our  
22 stations now are predominantly two-mode, they'll do either  
23 level I or level II, and they can do level II up to  
24 basically the peak of 220/80 amps, so that's a pretty good  
25 rate for any of these vehicles.

1           Level III, we're waiting for a standard, or DC  
2 charging we're waiting for a standard and we'll see that,  
3 too. So we do believe the whole range of vehicles ought to  
4 be covered. It's clear that the most emissions can be saved  
5 from some of the heavier vehicles, at least the pick-up  
6 trucks and up. So we're definitely in favor of  
7 accommodating those vehicles.

8           MR. OLSON: Just to clarify, do you own the real  
9 estate and the equipment, what --

10          MR. LOWENTHAL: No, we sell equipment and we sell  
11 these software packages. So our stations are always owned  
12 by the landowner.

13          MR. OLSON: Thank you.

14          MS. BARODY: Thank you very much. Peter, do you  
15 have any questions?

16          Okay, are we ready for the next presentation?

17 Great.

18          I'd like to introduce Sven Thesen from A Better  
19 Place.

20          MR. THESEN: Okay, so A Better Place is founded  
21 out of a company that the goal, the objective are ending our  
22 oil addiction and we do that --

23          MS. BARODY: Sven, I need you to speak right into  
24 the mike. Thank you.

25          MR. THESEN: Where do we use our oil? Because our

1 goal, as a company, is to end our oil addiction, and it's in  
2 the light-duty fleets, primarily, and that's where we're  
3 starting first to end this oil addiction and the solution is  
4 electric vehicles.

5           And so we are an electric vehicle services  
6 provider and we solve all of those issues associated with  
7 getting people out of that gasoline combustion engine into  
8 the EV.

9           What are those barriers? The first one is cost.  
10 An electric vehicle is inexpensive or it's cheaper than its  
11 gasoline brethren, except of that battery. And The Better  
12 Place model, we own the battery. We own and manage that  
13 battery.

14           Just like you wouldn't buy an internal combustion  
15 engine care and all the gasoline you'd use for its entire  
16 lifetime, you don't need to buy that battery or own that  
17 battery, we own that battery and we can maximize its usage  
18 so the cost of that battery is less for everyone involved.

19           The issue of range, that's the second obstacle.  
20 We solved that problem by putting in battery switch  
21 stations. And the good thing about the battery switch  
22 station is because you don't own the battery, you don't care  
23 what goes in and goes out, and the battery.

24           So you go in, you have a hundred-mile range,  
25 switch out the battery and off you go for another hundred

1 miles. So you can go from here to Tahoe, or down to L.A.,  
2 or wherever you'd like to go.

3           From a grid perspective, we want to make sure that  
4 we don't damage the grid or negatively impact the grid  
5 because electric vehicles can do both great things to the  
6 grid and bad things. If everyone starts charging at once,  
7 we suddenly have a new spike, a new peak, we have to build  
8 peaker plants, that's bad.

9           But when you aggregate and orchestrate all of  
10 those vehicles charging, not only can you solve that problem  
11 of that new peak, but you can harvest wind power, do  
12 ancillary services. There's a whole number of things you  
13 can do with EVs. And again, all of this in The Better Place  
14 model drives the costs down for the user, to get everybody  
15 out of their internal combustion engine vehicles into those  
16 EVs.

17           So our latest news in terms of is this a real  
18 business model is that in Frankfurt, in September, we  
19 announced with Renault, our leading automobile partner, that  
20 we're moving 100,000 fully functional electric vehicles into  
21 Denmark and Israel between 2011 and 2016.

22           My understanding is that at the height of the  
23 California EV heyday, late 1990s, early 2000s, there was  
24 roughly 5,000 EVs at the time. That is 20 times that  
25 number.

1           Is that right, Craig, five, six thousand?

2           Twenty times that number into two small countries.  
3 That's roughly four percent of the Israel fleet. And if  
4 that was California, that would be a million vehicles here  
5 if we bring it up to scale, and even more in the U.S.-wide,  
6 between now, 2011, and 2016, real EVs to move the country  
7 off of oil.

8           So what do we do? We own the batteries, we also  
9 own and operate charge spots, and we're putting them in  
10 Israel right now, for exactly the reasons that Richard said,  
11 to get people familiar with them. Because we'll be honest,  
12 the vehicles have a range of about a hundred miles.

13           Right now we're driving with internal combustion  
14 engine vehicles with 300. So yes, we're cutting the range,  
15 just like you do with an EV, but when you have this network  
16 of charge stations around the country, where you work, where  
17 you sleep, you will charge, you will feel good about it, you  
18 won't have this range anxiety.

19           Again, we're installing them at work, public  
20 stations, and in the homes.

21           The same thing for COP 15, in Copenhagen we're  
22 putting in electric vehicle charge stations there, and we'll  
23 talk more about that in Demark.

24           To demonstrate the battery switch station, to show  
25 that this was a real function, we got a grant from the

1 Japanese government and demonstrated it in Yokohama. This  
2 demonstration was so successful we're moving in to do Tokyo,  
3 to do a taxi fleet there, to put in switchable batteries to  
4 show how well they work with the taxi fleet. That should be  
5 launched, up and working, you can go drive an electric  
6 vehicle with a switchable battery next year.

7           Anybody go to the Olympics in China? No? Me  
8 neither, but the busses that they ran, they were dedicated  
9 EV buses with lithium ion batteries and they were all with  
10 switchable batteries, and they had similar, exact -- or very  
11 similar to The Better Place, where the batteries were moved  
12 automatically, put in a rack, quickly charged and then,  
13 while it was charging the vehicle was out, its brethren  
14 batteries were running those vehicles.

15           In addition to Frankfurt, we also demonstrated  
16 what we call both our in-car services and our grid services.  
17 The in-car function is as you're driving to let you know  
18 where those charge stations are.

19           If you're out of your normal drive pattern and  
20 say, oh, it looks like you're going to Tahoe, oh, it looks  
21 like you're going to L.A., the battery switch station is  
22 located here, we'll have a battery teed up for you, you pull  
23 in, and the battery is switched out in less than 90 seconds  
24 and you're on your way again.

25           And all this information is relayed to you via the

1 web, or your cell phone. The fun part is, it actually tells  
2 you, for example, it will send you customer service signals  
3 like your vehicle's in your driveway, but it's not plugged  
4 in. It seems like whoever drove it last didn't plug it in,  
5 please go plug it in.

6           So what do we do in terms of our electric vehicle  
7 service equipment? To be honest, it's pretty much standard  
8 equipment. Part of me says all of us suppliers here should  
9 sort of stand up and do the Can-can, because from a  
10 technology perspective we don't offer anything super  
11 different. One of our differentiators is that we don't  
12 offer a screen or a keyboard, we use a Smart Card to  
13 initiate charging and you communicate, again, through the  
14 cell phone or the web.

15           Just like Richard said, the installation cost per  
16 unit is what I call a snowflake, that it's very -- due to  
17 that specific location -- anyone know what their -- how much  
18 electricity gets feed to the house, like if you go to the  
19 main panel on your house it says a certain number of amps.  
20 We've got people with a 100-amp service, they're going to  
21 probably need a new -- maybe even a new drop line to get  
22 more service into their house, we have people with 400 amp  
23 service that are fine from the get go, but they may want  
24 their charge point off in their garage, and their fuse box  
25 to run the wiring is half a mile away.

1           So the cost is variable, but from the actual unit,  
2 itself, it's less than \$2,000.

3           From a solution perspective we offer the service  
4 of aggregating all of these vehicles. The charging  
5 orchestration, so we can time the charging to harvest wind  
6 and to enable demand response, although we actually see  
7 demand response as not being an issue because not many  
8 people, due to the CPUC, are actually going to be charging  
9 on-peak. There will be a few, but in terms of demand  
10 response not such a bit issue. It's more going to be about  
11 doing things at nighttime to minimize the impact to the grid  
12 and that's obviously both to the transmission and the  
13 distribution.

14           So it's we help both the vehicle driver in  
15 informing them their state of charge, where the charge spots  
16 are, where the battery switch stations are, and then also  
17 help the utility in making sure we don't negatively -- and  
18 not even not negatively, but positively impact the grid.

19           From a perspective of you guys, what we think you  
20 should do, funding is needed in California.

21           I had some European colleagues say that the United  
22 States, if we really want to move EVs that our policies are  
23 in the way and they use the term "retarded." We're hampered  
24 by the policy we have in place if we really want to go to  
25 EVs, and that we have low gas prices.

1           In Europe and elsewhere, they have high gas prices  
2 and they have taxes that promote EVs over the internal  
3 combustion engine.

4           So what do we do to get around that? So we need  
5 to think about things. We have already the Federal \$7,500  
6 grant is great, but what else can California do? So we need  
7 to fund infrastructure to solve this whole petroleum  
8 addiction, the big picture.

9           We're focused on level II charging and the battery  
10 switch station, but we see a role for all types of charging.

11           But if we really want, really want to get off  
12 petroleum, we need to solve that issue of long-range  
13 driving; how can we go the distance?

14           Because right now, unfortunately, while level III  
15 charging does provide a large number of miles in a  
16 relatively short time, it doesn't give that gasoline station  
17 experience. It stills takes 45 minutes, and hour to get  
18 that hundred miles in charging.

19           The only way you can get around that -- oh  
20 goodness, it's okay -- is to have the battery switch  
21 station.

22           So as part of the task let's make a comprehensive  
23 solution for our infrastructure.

24           Then if you look at it, I like what -- I like  
25 Richard's projections. We're a little bit lower than that,

1 but the point being that we're going to need a lot of EVSC  
2 put into the greater Bay Area, and California as a whole, to  
3 address all of the EVs that are coming by 2012.

4 And that, besides keeping open markets and a  
5 competitive nature, is really it. Thanks.

6 MS. BARODY: Thank you, Sven.

7 (Applause.)

8 MS. BARODY: We have a few questions for you,  
9 Sven.

10 MR. OLSON: Thank you. Sven, this is Tim Olson  
11 for the record.

12 Can you just elaborate, the information you  
13 provided on cost, the \$2,000, that's for the metering, what  
14 is that -- what was that referring to?

15 MR. THESEN: That refers to the electric vehicle  
16 supply equipment, so that includes the metering, the actual  
17 box, itself, the J-1772 plug, the box.

18 MR. OLSON: And can you provide us with  
19 information on the battery change-out cost, the switch-  
20 station cost?

21 MR. THESEN: They vary depending on what size  
22 we're going to have and how many different batteries we're  
23 going to have in there, but roughly less than \$2 million.

24 MR. OLSON: Per installation?

25 MR. THESEN: Correct.

1           MR. OLSON:  And what are you proposing in terms  
2 of -- you're proposing that as a corridor type of --  
3 transportation corridor type of installation?

4           MR. THESEN:  Correct.  So eventually we see them  
5 dotted from here to L.A., up to Tahoe, Sacramento.  So just  
6 like we're based on the cell phone model, so just like you  
7 started in the major metropolitan areas and worked out,  
8 that's how we see it working.

9           MR. OLSON:  What's your -- you have existing  
10 relationships with battery manufacturers?

11          MR. THESEN:  We do, A123 and NEC.

12          MR. OLSON:  So one of the things that -- you don't  
13 have to answer this here, but I just want to pose this for  
14 everybody here.  We are considering -- we have a -- Peter  
15 raised this point and it's a solicitation upcoming, that's  
16 his slide was \$9 million for manufacturing.  Helping locate  
17 manufacturing plants in California, batteries, vehicle  
18 component parts, whole vehicles, and we are thinking of  
19 attaching a condition to that, that would be something like  
20 this; that at some minimum percent of any incentive, whether  
21 it's for infrastructure, vehicle rebates, et cetera, has to  
22 be connected to some local, locally made product.  Haven't  
23 decided with that percent number, but that's something that,  
24 in essence, we don't just want to be the buyer and the  
25 purchaser of the vehicles here and users of it, we also want

1 to manufacture that, some part of that equipment.

2 So that's something I'd like you to consider.

3 MR. LOWENTHAL: If I could just respond to that,  
4 as a reminder, when you install a level II EVSE it puts  
5 three people to work for a day, two to install it and one to  
6 make it, so there will definitely be California jobs from  
7 this program.

8 MR. THESEN: And if you look at the actual cost of  
9 the box compared to the cost of the installation, you'll see  
10 it's a much higher ratio. While there is manufacturing  
11 associated with that box, its cost is not as much as the  
12 installation cost, itself.

13 MR. OLSON: And Sven, could you just clarify, does  
14 your company do home recharging, is that in your plans?

15 MR. THESEN: Absolutely. Absolutely. In Israel,  
16 our first country of launch, we see it in more public  
17 charging because more people live in apartments, and  
18 duplexes, and condos but here it's obviously going to be in  
19 the home charging market.

20 MR. OLSON: Okay, thank you.

21 MS. BAROODY: Sven, I have a couple questions for  
22 you, it's Leslie Baroody, for the record.

23 I'm just curious, has there been any technical  
24 problems with the battery switch out?

25 MR. THESEN: It's been cycling in Yokohama for

1 over 2,000 cycles and it wasn't expected as a -- it was just  
2 meant to be a demonstration to prove that it works and we  
3 haven't had or seen any technological glitches.

4           Sadly, it's not that actually complicated, it's  
5 just a lift and some latching mechanism. Not to belittle  
6 the latching mechanism, they can take nine Gs of force. But  
7 it's not -- from a physical, technological perspective, it's  
8 not that complicated.

9           Battery chemistry, that's complicated. Physical  
10 moving of 500-pound objects is not that complicated.

11           MS. BAROODY: And how many cars could a station  
12 handle at a time, would it be one, one at a time or --

13           MR. THESEN: So one lane, it takes roughly -- the  
14 cycle time, from cleaning the underneath of the car from the  
15 time you pull up or just before you pull up, drive in, drive  
16 out, we envision as being under five minutes. We can  
17 actually do the switching of the battery in less than 90  
18 seconds. We see the process taking roughly five minutes.

19           MS. BAROODY: Okay, thank you.

20           Anybody else?

21           All right, thanks, Sven.

22           Our next speaker, David Packerd with ClipperCreek.

23           MR. PACKERD: Call me crazy, but I have a paper  
24 copy just in case.

25           This is basically the same presentation, with a

1 little tweak, of what I did at the Plug-In Show. For those  
2 of you that were there, I apologize for that.

3 We're ClipperCreek, we're up in Auburn,  
4 California. The three founders, Jason France, who's here  
5 today, myself, and Mike Rogers were the principals of EVI,  
6 the company that was around from '93.

7 We've shipped over 2,000 EVSEs this year. We're  
8 in our 12<sup>th</sup> generation of product. We currently have three  
9 UL-listed products on the market and are currently the only  
10 UL-listed products available.

11 And we're all, as everybody is, waiting for the  
12 new connector, which should be coming soon.

13 And if you notice on the map, most our vendors, in  
14 fact all the vendors are California companies. We buy all  
15 our products, most of the plastic and metal is done up in  
16 Auburn and then all our other vendors are in California.

17 About the only thing that's not from California in  
18 our company is me, I'm from Georgia.

19 Some of the things we learned last time around,  
20 110 volt charging doesn't work. As Richard said, if you  
21 tried to charge a Mini E, you'd only be able to drive it  
22 every other day because it takes so long to charge.

23 And also the standard outlets we have today, I  
24 mean, one of the advantages of 110 volt, everyone thinks, is  
25 we have charging stations everywhere. But really, the

1 outlet you buy for 50 cents from Home Depot really isn't cut  
2 out to be run at full speed all the time, and plugged in,  
3 plugged out, you know, kids yanking on it, whatever, they  
4 just don't really cut it.

5 Plug-in cord connected level II for general public  
6 use really doesn't work, it's not safe. The power levels  
7 are really too high to be handled every day. We have our  
8 dryer plugged in but that's done once every ten years and  
9 you trip the breaker before you do it.

10 Also, with these plugs it's not safe at all to  
11 pulling them out while they're charging because you'll get a  
12 huge arc, it will be ugly and scare a lot of people.

13 And basically, in this industry we can't afford  
14 one mistake. I mean, it's all or nothing. And if anybody  
15 gets hurt, I mean, that's going to be all over the place, we  
16 just can't afford that.

17 And so we feel the EVSE's the way to go, the  
18 standard outlet -- standard plug. Luckily, this time all  
19 the automakers have agreed on one plug, which is going to  
20 make life a whole lot simpler for us.

21 Some of the locations for charging stations, where  
22 do we put them, we had a lot of experience, a lot of  
23 mistakes in the past. But, you know, we used to put them  
24 right in the front, you'd drive up to the mall, right there  
25 in the handicap spots there were EV charging spots, and that

1 just charged a lot of animosity, a lot of icing they call  
2 it, with internal combustion engine cars with parking with  
3 there in those spots because nobody was ever parked there or  
4 not that much, so people felt entitled to take them.

5 EVSE's should be put where we minimize the  
6 installation cost. We'll talk a little bit about that in a  
7 minute, but let's get it close to the service, let's reduce  
8 the cost, because we can talk about the cost of the charging  
9 station, you know, getting it down -- public charging  
10 stations down to a thousand bucks but, really, we can't  
11 affect the cost of cutting up concrete and installing, the  
12 actual physical labor of installing the charging station,  
13 there's no benefit in volume to those.

14 So really we just need to minimize it by being  
15 smarter when we install the charging stations.

16 And also, proper signage is essential. Let's let  
17 people know there's charging stations there, let everybody  
18 know there's charging stations, not just the select few that  
19 have vehicles, so that everybody can start thinking about  
20 electric vehicles, to that note, using it as a sales tool.

21 And also, you know, what's the big obstacle of  
22 driving an electric vehicle; it's range. It seems  
23 universal, even people that aren't that involved in the  
24 industry seem to know about the range.

25 And so when you see charging stations everywhere

1 all of the sudden you realize, hey, if I can plug in  
2 everywhere, I'll have the range I need to drive this car  
3 everyday and so it starts getting people thinking about it  
4 and talking about it, and it starts working as a sales tool  
5 and encourages the use.

6           Also, having a lot of charge stations, if in your  
7 mind you think I'll take the EV for short trips and my  
8 internal combustion car for long trips, the more charging  
9 stations you see, the more trips you realize you can take an  
10 electric vehicle with and start using it for more miles to  
11 maximize the use of the electric vehicles.

12           I think we found in the past people bought  
13 electric vehicles for their second car, they figured they'd  
14 take it out on weekends. Within a year they were using that  
15 as their primary car, trying to maximize the use, they're  
16 fun to drive.

17           The real cost, again, installation cost outweighs  
18 the cost of the EVSEs, it really can be significant.

19           The Southern Company did a great job with their  
20 installations, they got a cookie cutter approach, they went  
21 into the malls, they got as close to the service entrance as  
22 they could, they had one transformer set, they ran 12  
23 stations off it and used that same installation everywhere  
24 they went. And they got their cost down to about \$2,000 per  
25 charging station for installation. And for public installs,

1 that's pretty significant.

2           And really, what we're trying to focus on is  
3 keeping the savings of driving an electric vehicle in the  
4 pocket of the driver. Electric vehicles, there's a high  
5 initial cost, but after that they're really cheap to drive,  
6 they're only about two cents a mile. And the more of that  
7 differential we can keep, that two cents to ten, or 15, or  
8 20 cents a mile that the internal combustion engines cost,  
9 cars cost to drive, the more of that we can keep in the  
10 pocket of the EV driver, the better off we are, the more  
11 they're going to drive it, the more they're going to enjoy  
12 driving it.

13           The good news. California has a lot of existing  
14 infrastructure, that's the low-hanging fruit that Richard  
15 was talking about, that we can go out and install the new  
16 standard connector that all the electric vehicles coming to  
17 market will have.

18           There are numerous grants -- well, yeah, there  
19 were numerous grants from the Feds, none of them came here.  
20 But there are still Federal tax credits that can help offset  
21 the cost of installations.

22           We feel that public infrastructure that's put into  
23 CEC money, perhaps should have the requirement that charging  
24 is provided for free and maintenance is provided for free.

25           In reality the electric cost, the kilowatt hour

1 cost is fairly insignificant when you talk about the cost  
2 for a retail job to get somebody in the door.

3           Again, Southern Company, who did a lot of studies  
4 on this, found that the malls were spending about a dollar  
5 fifty to get customers in the door, for every customer they  
6 got in the door was a dollar fifty.

7           And what they found with the public infrastructure  
8 that they had, that their customers, they knew how far away  
9 their average customer was, it was about 10 or 15 miles, and  
10 when they drove there the amount of electricity they used  
11 was just three or four kilowatt hours, based on how far they  
12 lived, they charged at home, they drove to the mall.

13           So this big fear that, you know, we're going to be  
14 running the charging station at six kilowatt hours straight  
15 through the day just never panned out, it was very -- the  
16 electric cost was very low.

17           In addition to that, people would come and park  
18 there and charge, get their 15 miles back in the first hour,  
19 but they'd shop for three hours.

20           So again, even if everyone came there and needed a  
21 charge right then, it took a little while for the turnover.  
22 And that's also why, not to belabor this point, but it helps  
23 to put charging stations in locations where people are going  
24 to be for a few hours.

25           Not to knock McDonalds but, you know, people

1 aren't there for very long. I know, I can only stand so  
2 many French fries, even my kids won't want to stay there  
3 more than a half-hour.

4           And you want to be installing infrastructure where  
5 people know that it's going to be, know that it is, and  
6 they're going to be there for a couple of hours so they can  
7 get a significant charge.

8           Residential load, again, you know, all the loads  
9 should be handled -- should have load management devices or  
10 whatever Smart Grid technology the utilities are rolling  
11 out, we should be able to tie into them to ensure that the  
12 vehicles are charged only in off-peak hours.

13           We should also move to some kind of residential  
14 managed EVSC, where the resident can actually handle the  
15 final steps of the install. Where their house can get  
16 prepped by an electrician, they can be ready to buy and  
17 electric vehicle and they can go out and buy it, and come  
18 home with a charger and handle the final steps of the  
19 install themselves.

20           Also we need to look at creative solutions. I  
21 think Sven was talking about limited capacity in your panel.  
22 Well, let's look at ways of sharing the load between the  
23 dryer, the oven and the EVSE. Because, you know, if you're  
24 going to charge at night, you're probably not running your  
25 dryer or cooking something in your oven at night, so you can

1 share that capacity in your panel with all these different  
2 loads within the house and save the \$10,000 it costs to  
3 upgrade the panel in a residence.

4           Looking at utility load, again, you know, tying  
5 into the Smart Grid or the load management, the demand side  
6 management that the utility has is needed right in the  
7 beginning.

8           And we talked earlier about, you know, clustering  
9 in different neighborhoods, it's vital that we manage that  
10 load for the utilities.

11           Fleets and other installations, again, we can  
12 maximize the amount of service that's available by sharing  
13 the load among the vehicles because they all don't need to  
14 be charged at the same time.

15           Again, in dual EVSEs, in managing different blocks  
16 in a -- you know, like here we manage four different,  
17 separate blocks of charging and each of those boxes would  
18 charge two separate vehicles, so we'd significantly reduce  
19 the service that had to come into that location to charge a  
20 fleet.

21           Just as a conclusion, I think level II's a  
22 necessity. Charge stations, public charging stations is an  
23 effective way to attract customers, to get people thinking,  
24 thinking about electric vehicles, get the market moving.

25           Installation costs far exceed product costs. I

1 mean, I think we can -- we've done a good job, at least we  
2 feel ClipperCreek, one product fits all right now. We use  
3 one product, maybe a few separate modules or feature sets  
4 that will work for residential, public infrastructure,  
5 fleet, but we need to eventually go to separate products for  
6 each of those markets when the volume gets high enough, and  
7 all we're trying to do is maximize volume.

8 Utilities need the ability to control the EVSEs  
9 early on.

10 And we think the industry will provide significant  
11 benefits to California, like we talked about earlier.

12 Getting the manufacturing in California, we have a  
13 lot of capacity in the State, we have a lot of smarts in  
14 this State and I think we can do this with a lot of  
15 California-born companies, and vendors, and suppliers.

16 Thank you.

17 (Applause.)

18 MS. BAROODY: Thank you. Thank you very much.

19 Are there any questions for David?

20 MR. OLSON: Yeah, David, Tim Olson. I wonder if  
21 you could -- what do you mean by signage, freeway signage,  
22 if it's a shopping mall just so you know where the location  
23 is in that mall parking lot or what?

24 MR. PACKERD: Well, you start on the public drives  
25 to identify electric vehicles, the charging stations. So

1 when you're going that you don't have to pull into the mall  
2 to know where it is, you know when you see a sign, even  
3 coming off the highway, that there's electric vehicle  
4 charging there.

5 MR. OLSON: And on the installation for  
6 homeowners, this point you're making about the final  
7 installation by the homeowner, would a 200-amp service,  
8 would you have to do any kind of an upgrade to the service  
9 box; would 200-amp service be suitable for your household  
10 use and charging vehicles?

11 MR. PACKERD: It should be. I mean, you know,  
12 that's a lot of power but, you know, some of these houses  
13 are pretty big.

14 But if you look at a -- from my experience, only,  
15 from, you know, a 3,000 to 4,000 square foot house, a 200-  
16 amp panel should handle everything including a six-kilowatt  
17 electric vehicle charge station.

18 MR. OLSON: And can you make a comment on whether  
19 some of these -- the extent that these installations should  
20 be cost shared?

21 So our approach typically is we like to see cost  
22 share, particularly if it's a private entity, and we want to  
23 reward the early adopters on this and get enough  
24 infrastructure in place, but we're looking for a cost share;  
25 what's your comment on that?

1 MR. PACKERD: Well, it --

2 MR. OLSON: What level that might be, if at all?

3 MR. PACKERD: Well, I think it depends on -- you  
4 know, like some of the criteria that I talked about, if  
5 they're willing to provide the electricity for free and  
6 provide all the maintenance for the stations, then perhaps  
7 they get more cost share. You know, maybe it's up to 75  
8 percent given those criteria and dropping down to 50 percent  
9 if you don't want any ties.

10 But also I think it all has to be, I would think,  
11 available to the public.

12 MR. OLSON: And what's your knowledge, with local  
13 governments they don't tend to have a lot of money, what's  
14 your feeling about that, if it's a local government  
15 installation that's also public access?

16 MR. PACKERD: Good question. I mean, I think  
17 everybody has to have skin in the game or else you don't  
18 value and we'll start getting installations that, you know,  
19 may not be the best use of the money.

20 So if there is some -- any amount of money have to  
21 be provided, then it makes people think a lot more about it.

22 MR. OLSON: Okay, thanks a lot.

23 MS. BAROODY: Any other questions?

24 Thanks a lot, David.

25 Okay, next up we have Innovative Transportation

1 Systems Corporation, Sandor Shapery, is that Shapery?

2 MR. SHAPERY: Yeah.

3 MS. BAROODY: Thank you.

4 MR. SHAPERY: Good morning, I'm Sandy Shapery,  
5 President of Innovative Transportation Systems Corporation.

6 I want to share with you a concept that we've  
7 developed in conjunction with General Automics Corporation,  
8 AECOM, and my company Innovative Transportation Systems,  
9 also working with Southern California Edison.

10 This is an electric zero emissions container  
11 moving system for ports. This system was particularly  
12 designed for the Port of Los Angeles and Long Beach.

13 I'll give you kind of a quick run through of  
14 Innovative Transportation Systems, it's one of the Shapery  
15 group of companies. We've done everything from working with  
16 NASA on vertical takeoff aircraft ducted fan designs to  
17 developing, designing, developing and owning for our own  
18 account high-rise office buildings, hotels.

19 I don't know if anybody's been to San Diego, but  
20 that's where we're headquartered. The Emerald Shapery  
21 Center, a million square feet, built and owned the W Hotel,  
22 we own Sempra Energies Corporate Headquarters building in  
23 San Diego.

24 General Automics, our partner, is probably most  
25 well-known for developing the Predator, which is kind of our

1 most effective tool in our war against terrorism right now.  
2 They have a lot of other specialties they work on, navy ship  
3 electrification, and in fact that's kind of where this  
4 concept originated.

5           They're into fission, nuclear fusion, fission  
6 reactors, linear motors, Maglift systems, street car  
7 refurbishment and mining trucks.

8           AECOM is the world's largest engineering and  
9 environmental company and in fact they have designed and  
10 developed the Alameda Corridor, which is a major  
11 transportation system from the ports, assisting in moving  
12 containers and freight out of the ports.

13           This idea originated with military application,  
14 where General Automics Corporation has developed a linear  
15 motor aircraft launching system for the next class of  
16 aircraft carriers. In fact, the first one is going into the  
17 Gerald R. Ford that's under construction right now.

18           And basically it's a linear motor that will take a  
19 jet fighter plane, a 78,000 pound fighter plane, and  
20 accelerate it from zero to just under 200 miles an hour in  
21 about a second and a half.

22           And because of the fact that they're fighter  
23 aircraft, the system has to be failsafe and has great  
24 redundancy, so we're confident that our system will have  
25 little or no problem.

1 I approached General Automics several years ago,  
2 when I heard about their aircraft launching system and said  
3 why can't we use something like this to move train cars,  
4 with a zero emissions approach, instead having the overhead  
5 catenary wires, and that's kind of where the collaboration  
6 began.

7 The basis of the system is very, very simple, we  
8 start out with just some three-phase electric windings, you  
9 see on the left of the screen. We encase them in concrete  
10 so nobody can be out there stealing the windings. And then  
11 they're mounted between the crossties of railroad tracks.  
12 The only other element you need now, because we have the  
13 electric windings, is we put permanent magnets on the  
14 underneath side of some railroad bogies, and with a series  
15 of block switches we can then move these railroad bogies  
16 wherever we want, whenever we want.

17 We took the additional idea of for this port  
18 container moving system was to just pave the railroad  
19 tracks, so they're similar to streetcar tracks, and then we  
20 took a fifth wheel, that you find on diesel trucks,  
21 installed it on the railroad bogie and we can then put the  
22 trailers, and with the containers on them, and move them  
23 automatically, autonomously. So this is kind of an  
24 illustration of how it works.

25 Because you can only have one vehicle in a section

1 at a time, there is virtually no possibility of collision.

2 Another thing that we're working on also, as part  
3 of this system, also involves moving of the container. So  
4 right now procedurally, at the ports, at least in the Ports  
5 of Los Angeles and Long Beach, and many of the other ports,  
6 when they unload the ship the crane puts the container on a  
7 trailer, a yard hostler then takes the trailer to a stacking  
8 area where it's stacked, catalogued, and at a future date  
9 and time is put back onto a trailer and then moved to an  
10 intermodal container facility which, in the case of Los  
11 Angeles and Long Beach, is about five miles away.

12 This system that we're proposing will actually  
13 eliminate 1.2 million diesel truck trips per year.

14 From a standpoint of emissions reduction, there's  
15 35,600 tons per year of emissions will be eliminated, just  
16 in the San Pedro Bay Ports region.

17 We'll be converting 1.2 million diesel truck trips  
18 per year to a zero emissions container moving system.

19 From a fuel reduction standpoint, the net savings  
20 on a fuel per year will be about \$9.2 million.

21 It starts out that there's a, I believe, 10.6  
22 million in total fuel cost compared to electricity, our  
23 electric cost is about 1.6 million per year, so there's a  
24 substantial savings just in energy costs.

25 And in fact that savings energy cost will allow us

1 actually to reduce the cost of moving containers in the  
2 port. Right now the Port of Los Angeles and Long Beach are  
3 one of the more expensive ports because they have a number  
4 of charges imposed to assist in electrifying trucks and  
5 other means of eliminating pollution.

6 Give you a little information on the technology  
7 maturity, linear motors go back over a hundred years when  
8 Robert Goddard, who was known as the father of liquid fuel  
9 rockets, actually came up with the concept in 1905 when he  
10 conceived of, actually it was the first Maglift vehicle  
11 using linear motors, in a freshman engineering paper.

12 Linear motors are currently used in a number of  
13 rail systems, the Vancouver Light Rail System, (inaudible)  
14 Port Transfer, JFK Air Train, the Detroit People Mover,  
15 Scarborough Light Rail in Toronto, and the Shanghai  
16 Transrapid System.

17 The Shanghai Transrapid System is a little  
18 different and that's kind of the design that we're using, in  
19 that the other systems have what they call a shortstater  
20 system, which means that the stater part of the motor is on  
21 the vehicle. And what that requires then, if you have your  
22 motor on your vehicle, you have to get power to it. So in  
23 those cases, every case except the Transrapid system, you  
24 have to have a hot third rail or some sort of a brush  
25 configuration to get your power.

1           And we just felt that that was just not safe and  
2 not a good way to do it.

3           So using the longstater system we actually  
4 energize the motor or the windings in the track. And our  
5 vehicle's what they call a dumb vehicle, there's nothing on  
6 board but just a set of magnets that will move it.

7           Or if you use a linear induction motor in your  
8 synchronous motor, you can just do it with an aluminum plate  
9 instead of magnets.

10          We chose the linear synchronous motor because it's  
11 more efficient and the only difference that you have  
12 basically is putting the magnets on it, but it's much more  
13 controllable and a much better alternative.

14          For a container moving system you want to have --  
15 where you have a lot of vehicles, you want to have your  
16 vehicle costs very low, and that's one of the reasons also  
17 to utilize this system.

18          The other great advantage is that there's no  
19 chance of getting shocked or electrocuted. In other words,  
20 you could go up and drive a spike into the motor winding in  
21 the railroad track and nothing would happen because that  
22 track is only energized when a vehicle is over it.

23          So if you're standing on the track and driving a  
24 nail in there, the only time you'd get electrocuted you're  
25 probably going to get hit by the vehicle first, so it's not

1 likely you're going to get electrocuted.

2           Hope we can get the animation to work here. This  
3 is a -- okay. All right.

4           Well, this shows the control system and basically  
5 it's being used right now, the control system is being used  
6 on linear motors for conveyor systems.

7           I guess their animation's not going to work.  
8 Sorry about that. But the animation shows a number of  
9 vehicles coming in from different directions and they'll  
10 stop and let the other ones go, so it's totally controlled,  
11 no chance of collision at all.

12           And the next slide I'm assuming the animation's  
13 not going to work either, but this basically -- oh, here we  
14 go, we got one working.

15           So this is a virtual train where you can basically  
16 have -- the vehicles are really not connected and you can,  
17 by computer software, send any vehicle to any specific  
18 destination that you want.

19           Basically, the development plan, there's really  
20 four phases to it. And again, this is a privately financed  
21 project, ultimately privately financed once we get to a  
22 certain point.

23           Phase one is design, build a demonstrator and  
24 that's about a 12-month schedule.

25           Phase two is the design development to permits.

1 Now, this is where all the detailed engineering work is  
2 done, all the civil engineering work is done, the  
3 environmental work, and you then get to the point of  
4 building permits.

5           Once all the permits are available, then private  
6 financing can be obtained.

7           Oh, I forgot to mention we've also partnered with  
8 Macquarie Bank. Macquarie is the largest infrastructure  
9 bank in the world, they're also the largest owners of toll  
10 roads. And in fact, they look at this system as kind of a  
11 gloried toll road.

12           Construction will actually take about 30 months  
13 for the system. So in order to secure or develop the  
14 project, we have to first secure a location for proof of  
15 funding for the -- or proof of concept demonstrator, and  
16 we're working on that right now.

17           Obtain partial funding from Federal and/or state  
18 grants, with matching funds. We have a tentative commitment  
19 from the South Coast Air Quality Management District, CARB  
20 is looking at assisting us and, hopefully, the California  
21 Energy Commission will step forward with help.

22           Supplemental match will come from government  
23 fundings and private in-kind contributions.

24           For example, some of the equipment can be donated,  
25 we can take credits for that. So these are important

1 considerations in putting together a privately financed, or  
2 public/private finance system.

3           Then at that point, once we develop the  
4 demonstrator and we have working drawings for the permits,  
5 and that's basically the phase one funding sources.

6           Phase two is the design development funding for  
7 permits. First, we have to win the RFP to develop this  
8 system from the Ports of Los Angeles and Long Beach. Then  
9 at that point there are additional possibilities, such as  
10 TIFIAA loans, in-kind contributions, which will take us to  
11 the detailed design for the operating system.

12           Initial environmental studies and impacts will be  
13 done and then, at the same time, part of this will require  
14 developing a community and user outreach program. We have  
15 to -- we want to bring in not only the users, but the  
16 community to create an advisory committee to make sure that  
17 all of the community issues are being addressed.

18           And then, at that point we have to negotiate a  
19 long-term operating contract for the operation of the  
20 system.

21           Incidentally, General Automics, in addition to  
22 building this system will also be handling long-term  
23 maintenance.

24           The financing plan basically is financing will be  
25 available upon receipt of all the development permits. What

1 we have to do is determine the operating income and expense,  
2 determine the capital cost, develop the financial business  
3 plan, and then determine if public sector funding is needed  
4 to cover any possible shortfalls. Those are basically the  
5 phase three financing plan.

6           The demonstrator, for preliminary pro forma, our  
7 demonstrator costs we expect to spend between eight and ten  
8 million dollars, and we would be looking for some public  
9 funding and some help in that.

10           The design development cost, bringing it to  
11 permits, would be another 22 million. So we're total pre-  
12 development costs of about \$30 million.

13           Now, depending on the cost of -- or depending on  
14 the route that we use, we've analyzed some routes that the  
15 Port of Long Beach is looking at. We think there are some  
16 better possible routes because some of their routes require  
17 elevated tracks and that substantially raises the cost.

18           We believe we can do this project for as low as 10  
19 to 12 million dollars per mile. Using the current proposed  
20 alignment that was dictated by the Port of Long Beach,  
21 basically we're looking at about \$19.5 million per mile in  
22 cost.

23           But when you compare it to the other proposed  
24 systems, such as the Maglift system, those run between 50  
25 and 100 million a mile. So when you look at our \$468

1 million it sounds like a lot of money, but when you compare  
2 the alternatives, or 1.2 billion to 2.4 billion to solve  
3 this problem, it brings the numbers into proper perspective.

4           This is a proposed alignment plan with seven  
5 pickup stations.

6           And looking at doing an operating numbers, taking  
7 the current revenues at \$75 a container is the average cost  
8 and there are 900,000 containers per year, that's \$69  
9 million in gross revenue.

10           When we looked at the labor cost we did an  
11 analysis to about \$21 million, energy cost 1.2 million,  
12 overhead and profit is 15 percent.

13           It's difficult to get private companies' interest  
14 unless they're going to be making some profit.

15           So the capital cost of debt service on the 19 and  
16 a half million times 24 miles, the 468 million looking at  
17 six percent comes in at about 35.5 million a year.

18           And so at current costs, and if we were to build  
19 it today, there would still be 950,000 income available to  
20 retire the \$30 million pre-development cost.

21           Now, if we look at the average for 24 years and we  
22 discount the cost of moving the containers by 15 percent, in  
23 other words, you know, we want to eliminate pollution and  
24 reduce operating costs, basically it comes down to the fact  
25 that the project gross income after expenses -- I'm sorry,

1 the gross revenue is 84 and a half million, we take off  
2 expenses, we're down to about 49.62 million, we take off our  
3 35.5 million debt service and it produces about \$14 million  
4 a year in net income. So it is financeable and Macquarie  
5 Bank is very interested in doing that.

6 So that's basically the presentation, are there  
7 any questions?

8 MS. BAROODY: Any questions?

9 MR. OLSON: Yeah, Sandy, I have a couple  
10 questions, this is Tim Olson.

11 You -- I didn't catch what the status of that RFP  
12 was, where is that in the process at this point?

13 MR. SHAPERY: Right now the Port has put out an  
14 RFCS, request for concepts and systems, and we are  
15 responding to that. Our submission is due the 25<sup>th</sup> of this  
16 month, we will have that in, they will be analyzing the  
17 different proposals coming in and then preparing the RFP  
18 sometime next year.

19 MR. OLSON: And that's they're obtaining the  
20 right-of-way for that. Is that, in essence, a rail line, is  
21 that how they describe it?

22 MR. SHAPERY: Well, the RFCS is rather open, it's  
23 not limited to a particular type of technology. So ours is  
24 using a rail system, others may be using magnetic  
25 levitation, others may be using roadways. So it's rather

1 open right now and I think that's why they went in with the  
2 RFCS approach initially, to find out, okay, what are all the  
3 concepts.

4           And as I say, there is so much existing rail track  
5 there that some of it's used, some of it's unused. Our  
6 engineering firm, AECOM, who built the Alameda Corridor, is  
7 very familiar and they believe that we can actually bring in  
8 using a lot of the existing rail and reduce the cost  
9 substantially, possibly by as much as half.

10           MR. OLSON: And is that, just for kind of going  
11 into a little more detail on the location, is that location  
12 from Port of Long Beach to -- there's a kind of a  
13 distribution point about five miles away from that; can you  
14 just elaborate on that a little bit?

15           MR. SHAPERY: Yes. The way the procedure works is  
16 all the containers or most of the containers ultimately end  
17 up at the intermodal container transfer facility. Now, that  
18 is operated by Union Pacific. They're planning also on  
19 building along the way -- in fact, the intermodal container  
20 facility, if you see that blue line, ICTF, that's where it  
21 ultimately goes to and that's about a five-mile difference  
22 from the port's loading stations.

23           MR. OLSON: Is that along the 710 corridor there?

24           MR. SHAPERY: It's not. That's proposed along the  
25 Dominguez Channel and through the port.

1 MR. OLSON: Oh.

2 MR. SHAPERY: There is some -- there are proposals  
3 to develop the 710 corridor for truck traffic and, in fact,  
4 this same linear motor concept can work in the 710 corridor  
5 to move trucks, the same as it can move these rail cars.

6 MR. OLSON: And is there proprietary technology in  
7 this that --

8 MR. SHAPERY: Yes, there is. The proprietary  
9 technology, we have several. One is -- well, linear motors  
10 have been around for many, many years, so we could not  
11 protect that. But the idea of coupling the trucking  
12 facility, where we can actually hook containers onto our  
13 bogies are protected.

14 And then we also have a collection station system  
15 which is rather unique, and we have that protected also.

16 I was going to put a slide in here, in fact we  
17 just got our preliminary patent filed the other day but,  
18 unfortunately, I didn't -- I noticed the slide's not in here  
19 and I forgot to put it in, so I apologize for that.

20 MR. OLSON: And then the amount of money the Port  
21 of Long Beach -- is it the Port of Long Beach or Port of  
22 Long Beach and L.A.?

23 MR. SHAPERY: Yes, Port of Long Beach. And in  
24 fact it's going to be -- the proposal program will be  
25 ultimately taken over by the Alameda Corridor Transportation

1 Authority.

2 MR. OLSON: Are they -- how much money did they  
3 set aside, their own money for that project?

4 MR. SHAPERY: Our understanding is they set aside  
5 nothing, so they're looking for privately-funded proposals.

6 MR. OLSON: And South Coast, the same thing?

7 MR. SHAPERY: South Coast has indicated a  
8 willingness to put some funds up for this project, yes.

9 MR. OLSON: And what's the time frame when they're  
10 going to give you a decision on that concept?

11 MR. SHAPERY: I don't recall, but I believe it's  
12 going to be sometime next year.

13 MR. OLSON: Okay. All right, thank you.

14 MR. SHAPERY: Thank you.

15 MS. BAROODY: Okay, thank you very much, Mr.  
16 Shapery.

17 (Applause.)

18 MS. BAROODY: Okay, we're going to keep rolling  
19 here so we can keep up with our schedule.

20 Next we have John Gustafson with Cascade Sierra.

21 MR. GUSTAFSON: Good morning, you've heard about  
22 vehicle technologies and now you've heard a discussion of  
23 some of the infrastructure work on the hybrid rail, and rail  
24 trailer technology.

25 We're going to now turn our attention to the

1 segment of heavy trucking and the infrastructure for heavy  
2 trucking that runs on the interstate corridors.

3 I'm with Cascade Sierra Solutions, we're a  
4 nonprofit company originally formed in Oregon, but now  
5 working on the I-5 corridor.

6 What we do is we identify clean technologies and  
7 transportation applications and these applications are  
8 intended to improve air quality and the slow climate change.

9 What we do is, as a nonprofit we work with  
10 government agencies, the equipment manufacturers, the  
11 trucking companies, and financial institutions to put  
12 together innovative financing partnerships that can solve  
13 the capital access problem that truckers have.

14 Our role is to gather the technologies, the  
15 grants, the tax credits, the rebates, rules, et cetera and  
16 make those available to the trucking industry.

17 The trucking industry would be your carriers and  
18 also your truck stops.

19 We're currently operating on the I-5 corridor,  
20 serving primarily the over-the-road trucking community. As  
21 was explained earlier, there's about a million trucks  
22 operating -- excuse me, three million trucks operating in  
23 California. About a hundred thousand of those trucks are  
24 over-the-road trucks, and at any one time 20 percent of  
25 those trucks are from out of state. The 20 percent out-of-

1 state trucks rotates about every four days, so you have a  
2 fresh batch of over-the-road trucks.

3 But as you see we're currently operating in  
4 Seattle, and in Portland, and in Eugene, Oregon.

5 We have an outreach center in Sacramento and we're  
6 soon to have an outreach center in Los Angeles. We have  
7 people on the ground in each of those locations.

8 The outreach center essentially is a facility  
9 about twice the size of this room that gathers all the  
10 relevant technologies that truck owner or operator might  
11 like to see, that he could put onto his truck. And then in  
12 that center also we have deployed all the capital incentive  
13 programs that that truck operator can take advantage of to  
14 purchase that equipment.

15 So now let's turn to truck stop electrification.  
16 Over a hundred thousand heavy-duty trucks operate on the  
17 West Coast and this group's movement is projected to grow 70  
18 percent by 2020.

19 The principal opportunity for fuel savings and for  
20 emissions reductions is to eliminate the idling component of  
21 those trucks. Now, as you know, every truck that's over the  
22 road is required to stop for ten hours after operating for  
23 14 hours, and that's called a required rest period.

24 The opportunity for public incentive is to help  
25 the truck operator get out of idling his diesel engine.

1 That's about a gallon to a gallon and a half per hour for  
2 that ten-hour period of time.

3           What we feel is that truck stop electrification  
4 should be built by the private fleets, at the private fleet  
5 locations and the commercial truck stops along the primary  
6 routes, and those routes are identified primarily as the  
7 interstate highway system.

8           This is required -- this is awfully important for  
9 California because so much of California's agricultural and  
10 industrial base is tied to distributing goods elsewhere  
11 across the nation. About half of the states now have no-  
12 idle rules and so the truck drivers are being forced to look  
13 to alternatives to idling the truck.

14           We've proposed to Department of Energy a \$22  
15 million grant program from the Department of Energy, with  
16 match and then private sources, total project value of about  
17 \$68 million, to install 50 truck stops on the interstate  
18 freeways across the United States.

19           The 50 truck stops would each deploy about 30  
20 power pedestals and we would deploy those power pedestals  
21 along the routes that are most heavily utilized by trucks  
22 that travel to and from California.

23           About 60 percent of the grant funds that we've  
24 proposed to DOE would actually provide the owners of the  
25 trucks to buy the equipment that will go on their truck to

1 attach to the pedestals, and then also to assist getting in  
2 the other kinds of equipment, the HVAC systems, and the  
3 various kinds of things that actually make a truck suitable  
4 for power pedestal use.

5           With these 50 truck stops, we would eliminate  
6 about 36 million gallons of fuel, 370,000 tons of CO2,  
7 140,000 tons of use of particulate matter, and 7,000 tons of  
8 nox in a ten-year period.

9           In order to proceed with this project half of  
10 the -- there's two challenges that we face. The first half  
11 is to get the infrastructure on the trucks and on the  
12 freeway, in the truck stops, but then the other half of the  
13 challenge is to actually convincing the truck industry to  
14 change over to these alternative fuels and change over to  
15 stopping their trucks at truck stops. And so there's a  
16 heavy component of the project that's devoted to promotion.

17           What we are lacking in our proposal so far, which  
18 has been accepted by DOE, is getting about two and a half  
19 million dollars worth of match.

20           And what we would like to propose in the AB 118  
21 Investment Plan for next year is for California to step up  
22 with about \$2.5 million to support the ten truck stops that  
23 we've planned to put into California.

24           A studied alternative then is to study to see  
25 exactly what the optimum number of truck stops in California

1 might be. We don't know what that might be, it depends upon  
2 industry acceptance of the technology and the way the  
3 industry takes off, but it could be as high as 100 truck  
4 stops, which would be a program budget total of about \$22  
5 million.

6           If that were the case, we would expect that number  
7 of truck stops to be able to service about one-third of the  
8 visiting trucks in California at any one time.

9           Coupling up with this DOE grant, which is a  
10 program primarily for the entire United States, so it's very  
11 important because we have to have adoption of the technology  
12 for the entire United States and so the states need to be  
13 working hand-in-hand and it's appropriate that California  
14 join up with the California piece.

15           That concludes my remarks, I'll take any  
16 questions.

17           MR. OLSON: Yeah, John, this is Tim Olson. Can  
18 you just elaborate; what's the -- what date do you have to  
19 have that matching money for your DOE? And congratulations,  
20 you're one of the few companies that I think won something.

21           We will be formulating the matching team in the  
22 next three to four months and we're ready to speak about  
23 that today.

24           MR. OLSON: And so I'm just curious how you --  
25 you're doing some installations at the truck stops and then

1 something on the vehicle, is that an APU device for the  
2 truck vehicle or is that the --

3 MR. GUSTAFSON: The device that typically gets put  
4 on the truck is going to be an electric-powered HVAC system,  
5 and it can be an electric facilitated diesel-powered  
6 auxiliary power unit. Some of the auxiliary power units  
7 come with both electrical short-power attachment.

8 But we prefer, actually, going to a pure electric  
9 system, and they're cheaper, they're lighter, they're more  
10 efficient. And again, if there's not a diesel component on  
11 the truck that means they're saving more fuel.

12 MR. OLSON: Is that a pass-through grant from DOE  
13 through you to the truck owner, or are you doing this in --  
14 you have a very good program for loans, for your Smart Way  
15 and other things you do.

16 MR. GUSTAFSON: The part of the grant will be a  
17 pass-through to the truck owner and that's the piece that  
18 puts, helps him and it incents the driver with about 25  
19 percent of the cost of the APU or the equipment to go on  
20 their truck.

21 The infrastructure piece will go directly to pay  
22 for the equipment that's on the truck stop, itself, the 30  
23 pedestals. The pedestals will be a revenue-generating or a  
24 revenue-sharing piece with the truck stop, itself, and then  
25 the company that maintains, and services, and operates the

1 pedestals. And we're trying to keep a cost of about a  
2 dollar per hour that's going to be charged to the trucker  
3 that pulls up.

4 MR. OLSON: Can you give us any range of costs for  
5 those pedestal installations; what is it for each parking  
6 spot?

7 MR. GUSTAFSON: Per parking spot it's a -- there's  
8 a two--part answer there. It takes about \$35,000 to  
9 mobilize onto a truck stop and then each space is about  
10 \$6,000, plus or minus, depending upon local permitting  
11 conditions and the requirements to bring power over.

12 MR. OLSON: Okay, I think we'd want to talk to you  
13 at some point. If not today, at some point with you, Sharon  
14 Banks, and your other people. Thanks a lot, appreciate it.

15 MS. BARODY: Thank you, Mr. Gustafson.

16 (Applause.)

17 MS. BARODY: Okay, next up we have Aerovironment.  
18 And I have you as Kristin Helsel, but you don't look like  
19 Kristin.

20 MR. HAYASHIGAWA: Yeah, I'm not.

21 MS. BARODY: Okay.

22 MR. HAYASHIGAWA: I'm Larry Hayashigawa and I'm  
23 representing Kristin Helsel. She couldn't make it here, I  
24 think she got sick, so I'm going to try to do the best I can  
25 here.

1           Just a little background on Aerovironment, we were  
2 established in 1971, we have about 650 employees, and we're  
3 kind of a middle-sized company.

4           We have a legacy of innovation, we've been  
5 involved with alternative energy vehicles for quite a few  
6 years, going all the way back to the GM Impact, which was a  
7 predecessor to the GM electric car in the mid-1950s.

8           And from there we kind of split our business up  
9 into two major areas. One which is our number one revenue  
10 generator, which is the unmanned aircraft systems for the  
11 military, and for reconnaissance, and we've done quite well  
12 there.

13           And the other one a little bit more fledging, but  
14 ready to move out here with this EV business, is the  
15 efficient energy systems business, which covers all the EV  
16 test equipment, on-road fast chargers back in 1995, and then  
17 the off-road fast charging systems for all the lift trucks,  
18 and baggage handlers, and things like that at the airport.  
19 And then the EV chargers and fast charging system which are  
20 currently being developed or completed.

21           Just we're strongly a product-oriented company and  
22 so we have an extensive product array, which ranges all the  
23 way from -- for EV charging, let's say for in the public and  
24 residential area, our level II EVSE chargers for private,  
25 and public and fleet use, and then DC fast charging for

1 fleet and public use.

2           And then we also provide a neighborhood of  
3 electric vehicle chargers.

4           We also supply subsystems for EV manufacturers, so  
5 an EV manufacturer looking for a level I cord set, we'll  
6 provide them that, or an onboard charging system, or a  
7 lithium management system.

8           So we're involved in some of the subsystems on  
9 electric cars, also.

10           And then we also provide EV testing facilities, so  
11 we do a lot of battery testings for OEMs and kind of do some  
12 independent testing for other entities.

13           The other piece that I think we've kind of picked  
14 up here, because of this EV movement, is we have a program  
15 where now we have a nationwide installation in service and  
16 support program for installing chargers in the residential  
17 and commercial areas.

18           Thought I'd just throw up three little slides  
19 here, or three little tabs, to kind of describe maybe three  
20 scenarios that we see charging, we see at-home charging,  
21 which I think Richard likes to call where you sleep. But  
22 it's garage, curbside, multi-dwelling units, where you can  
23 get inexpensive off-peak energy power to charge your car.

24           Typically, it will be like either a level I or a  
25 level II charging, depending on the type of vehicle, whether

1 it's a battery electric vehicle or plug-in hybrid charge  
2 times might range anywhere from four to 20 hours, depending  
3 on the capability of your charger.

4           Then public and office charging areas used to  
5 extend the daily range of your vehicle. You would see  
6 anything -- it's very similar to what you'd see in the home  
7 charging environment, except I think you'd be a lot more  
8 time limited, so anywhere from four to eight hours of charge  
9 time would be available so, therefore, you could only bring  
10 your batteries up to a certain state of charge in that  
11 amount of time. But I think it would be just good enough  
12 for topping off to get home.

13           Then there's fast charging which -- fast DC  
14 charging, which I think a lot of people term as level III  
15 charging, but I think we're trying to change that  
16 nomenclature. Level III charging will be more like fast AC  
17 charging and then fast DC charging is its own category now.

18           And so you would use something like this for long  
19 distance travel, you might talk about highway chargers  
20 and/or a need to immediately charge your vehicle.

21           And something like this would take anywhere from a  
22 half-an-hour to one-hour charge time depending on, you know,  
23 how much energy you want to put back in the battery.

24           Oh, because of the widely varied installation  
25 requirements that we've had to face, we've had to come up

1 with multiple products and how we've answered that is really  
2 there's a core module that we utilize in every one of these  
3 chargers. So we might have a different basic stand, if you  
4 will, and then we plug in the different types of the core  
5 EVSE charger into that stand.

6 So we've got level II and fast DC chargers  
7 available for electric vehicles.

8 Some of these are more suited for garages which,  
9 like the first two, is probably more of a garage unit and  
10 then the dual port and the quad port are probably more for  
11 I'd say public parking spaces and multi-dwelling units.

12 These are kind of a hit list of infrastructure  
13 issues that we think we're facing. According to, and this  
14 is kind of a controversial topic I'm sure, but Pipe Research  
15 says that 80 percent of the chargers will be in residential  
16 locations.

17 And I think the fact that it's -- they're  
18 considering the level I chargers which come with cars as  
19 part of that. I think that's why the number is relatively  
20 largely skewed.

21 But nonetheless a lot of the focus, I think, on  
22 charging cars or electric vehicles will be in a residential  
23 area.

24 So what we're looking for is to encourage  
25 development of charging infrastructure for both residential

1 and public locations, and make sure that we have provisions  
2 for curbside residential needs, and also make a  
3 consideration for multi-dwelling unit needs.

4           And so anything that the California Energy  
5 Commission can utilize to help encourage the development of  
6 that process, that would really help speed the EV rollout.

7           Streamline residential installation processes,  
8 we've heard all kinds of stories about people -- you know,  
9 installations taking 30 days, or 60 days to do that, and  
10 we'd like to see this thing cut down to something like four  
11 days or three days. We've been challenged like a lot of the  
12 automotive OEMs to get it down to that day just to improve  
13 the user's experience with the EV.

14           So things like, you know, eliminate the need for  
15 submetering, that will probably speed it up. Although then  
16 you've got to figure out how to provide maybe EV power usage  
17 rates, but maybe there's more informal ways of measuring  
18 power for the time being.

19           Simplify permitting and inspection requirements.  
20 I think somebody suggested that the installer be certified  
21 to do that, so that the installer can actually certify the  
22 installation, that would really hurry things.

23           And then also if the PUC could be involved in some  
24 of the building codes, making sure that there's appropriate  
25 infrastructure in new buildings and new homes for EVs would

1 be something that could be quite useful.

2           The other thing we see is the distribution grid  
3 will likely be overloaded and I think the clustering effect  
4 was touched upon really early here in this forum, and we  
5 think that there's various technologies or programs that  
6 might help improve the distribution grid without having to  
7 spend a lot of money.

8           And then, lastly, we'd like to see some incentives  
9 for at least some method -- some highway charging  
10 demonstrations.

11           I think that one of the things I'd like to see  
12 here is actually going through implementing curbside  
13 implementation, multi-dwelling unit installations, and  
14 highway charging installations, just to kind of run through  
15 this whole process and actually try to execute on a program  
16 and see what kind of, you know, issues we run into, what  
17 kind of problems we run into, you know, what we could do  
18 better. And I think that's what some of these demonstration  
19 programs will really illustrate.

20           I think this is just a little bit on fast  
21 charging, since that's our thing here, can't let that go.  
22 But I think Commissioner Chong spoke about this TEPCO  
23 Electric Power Study and this is the study that they  
24 performed. And the little -- I don't know if you can  
25 actually see the little -- yeah, yeah, you can see the

1 little red arrows and those are kind of like where the cars  
2 drive around in the first chart, and then you see one little  
3 pink box, and that's the charger that they had there at, I  
4 think, Tokyo Electric Power, and the cars would only go a  
5 very limited amount of range. I'm not exactly sure what the  
6 mileage was, but they would only drive around a little bit.

7           Then they'd measure the stated charge of the  
8 vehicle, which is the chart below the map, and the cars  
9 would be coming in at 70 and 80 percent stated charge,  
10 ideally, so they weren't really utilizing the vehicle.

11           And what they found out was it was range anxiety  
12 and the people, the drivers were afraid to actually take the  
13 vehicles beyond a certain range because they were afraid  
14 they couldn't get it back.

15           So in July of 2008 TEPCO actually installed a  
16 second fast charger and you can see that on the second, the  
17 stage two map there, there's another chart. And then you  
18 can kind of see that they mapped out the vehicles again, and  
19 then when you looked at the stated charge of the vehicles  
20 that came back, the stated charges showed that the vehicles  
21 were being utilized in a much greater fashion.

22           And although many of them didn't -- I would say  
23 that I think the story is that most of them did not use the  
24 fast charger, so they just used the vehicle a little bit  
25 more, but they were confident that they could, if there was

1 a problem, you know, they could get back. So that's another  
2 kind of a use for fast charging.

3 This is my closing thing so I think the one thing  
4 is that we want the thing to be convenient, so we need to  
5 locate charging stations where drivers need and expect them,  
6 so home, work, retail, on the highway.

7 We should have some kind of pay-at-the-pump for  
8 public and fast-charging systems. We need to have standard  
9 connectors so that, you know, Mini Es can plug into EVSEs,  
10 and Volts, and Nissan Leaf can plug into the same  
11 connector and that's -- there's still a problem there,  
12 actually, today.

13 Fast charging, we think fast charging provides  
14 convenience, charging in minutes, not hours. Provides a  
15 range extension for battery electric vehicles and promotes  
16 use of EVs between cities.

17 It's not super rocket science, it's all been done  
18 before with forklifts.

19 And we'd like to have, and I think that maybe some  
20 more stakeholder participation from the OEMs. In terms of  
21 the installation process, I think they're going to face some  
22 challenges there that they haven't actually anticipated.  
23 And then, again, more demonstrations.

24 So kind of proof of installation concepts and  
25 theories that we all have here about how this industry

1 should work. And that's it.

2 MS. BARODY: Thank you, Larry. Any questions?

3 (Applause.)

4 MR. OLSON: Hi Larry, this is Tim Olson, I have a  
5 couple of questions here. Your comment about locate the  
6 stations where the drivers need them, is there enough data  
7 to do that? Are automakers providing that information to  
8 you or what has to happen there to --

9 MR. HAYASHIGAWA: Yeah, I think -- I think the  
10 only place the automakers are sure that they need charging  
11 stations are at the home. Other than that, they're kind of  
12 silent, strangely silent about exactly where they're going  
13 to go.

14 I think there's some organic ways of doing it,  
15 maybe polling the EVSE users, you know, and getting their  
16 feedback to see where they might -- would like to see  
17 charging stations appear.

18 MR. OLSON: And just to clarify, your company just  
19 manufactures the product or are you doing the installations,  
20 do you own any of the systems?

21 MR. HAYASHIGAWA: Yeah, we manufacture systems, we  
22 sell to OEMs, and we also provide installation service and  
23 after-sales support.

24 MR. OLSON: Can you elaborate on the cost of the  
25 fast-charge system?

1 MR. HAYASHIGAWA: Fast-charge systems today run, I  
2 think for a 50 kilowatt system, in the range of 30 to 35  
3 thousand dollars.

4 MR. OLSON: Is there any capability to reduce  
5 cost, either through technology advance, economy of scale,  
6 and manufacturing?

7 MR. HAYASHIGAWA: Yeah, there's -- of course. We  
8 build, just to give an idea, in the industrial forklift side  
9 we've got 30-kilowatt chargers that we sell for around  
10 \$9,000. So, yes, there's lots of room for cost reduction.

11 There's also different ways of maybe sharing their  
12 charger so that, you know, it can sequentially charge  
13 multiple vehicles at the same time and that will help reduce  
14 the infrastructure costs and capital costs.

15 MR. OLSON: So on the forklift, that's a more  
16 mature market for charging systems. Was there a breaking  
17 point where you started getting those cost reductions in  
18 terms of units sold?

19 MR. HAYASHIGAWA: Yeah, I think around -- I would  
20 be taking a guess, but probably around 8,000 units a year,  
21 that's when we started seeing some significant cost  
22 reduction. So it's not a lot.

23 MR. OLSON: Thank you.

24 MS. BAROODY: Thank you very much, Larry.

25 We're going to take just a five-minute break,

1 okay. I actually have Colin Read with ECotality, eTec, up  
2 next, he's here; right? Yes, okay.

3 So in about five minutes or so.

4 (Off the record for a break.)

5 MS. BAROODY: We will have Colin Read, with  
6 ECotality up next. And then after that we'll have Mark  
7 Aubrey, with Smith Electric Vehicles.

8 We are going to break at 12:30 and so we will have  
9 the Bay Area Electric Vehicle Corridor program go after  
10 lunch, if that's okay. Is that okay or, if not, we'll have  
11 you go before. What do you prefer, your choice, before or  
12 after? After, okay.

13 We're just a little behind, we have a little bit  
14 more time in the afternoon.

15 Okay. All right. Okay, I'd like to present Colin  
16 Read.

17 MR. READ: Great. Well, thank you, Leslie, I  
18 appreciate the PUC and the CEC inviting us down here to  
19 present today, to discuss a little bit about ECotality and  
20 what we're doing in terms of rolling out infrastructure and  
21 electric vehicles here in California, and four other states  
22 here in the United States.

23 That being said, I'd like to thank everyone for  
24 taking their option day of work here, on Columbus Day, to  
25 come be with us. Thank you.

1           ECOtality, we're a leader in clean electric  
2 transportation. Are two primary subsidiaries or eTec,  
3 Electric Transportation Engineering Corporation and Energy  
4 Power.

5           Most of this presentation will be focused on the  
6 work that ECOtality does through our primary operating  
7 subsidiary, eTec.

8           But just briefly, Energy Power is a manufacturer  
9 of specialty solar application, solar modules, as well as  
10 renewable battery systems.

11           So from about a 40,000-foot view right now,  
12 ECOtality, we're a leader in clean electric transportation.  
13 We are one of the few firms that were lucky enough to  
14 receive Federal funding for transportation electrification.

15           As part of that project we're deploying  
16 approximately 4,700 Nissan Leaf electric vehicles, pure  
17 battery electric vehicles, zero emissions. We're doing this  
18 in five states, about 13 different cities at this point.

19           We're going to be deploying a total of 11,210  
20 charging stations in these five different markets.

21           I'm going to go a bit into detail about this, what  
22 we're calling the EV project, later on in this presentation.  
23 I'd also note that the California Energy Commission has  
24 awarded us funding of \$8 million, of which we're very  
25 appreciative, thank you, which will be going towards the

1 deployment of infrastructure in San Diego.

2           A little bit of facts about ECotality. We have  
3 been involved in every major EV initiative since 1989, eTec,  
4 our main subsidiary, was actually founded in 1996, but  
5 through its affiliate companies, Electric Transportation  
6 Applications, in the Clarity Group, actually has a history  
7 back to 1989.

8           Our primary product that we provide, our service  
9 offering, is fast-charging systems. We've installed over  
10 5,600 charging systems for industrial, airport systems, and  
11 the like. That technology has over 50 U.S. and  
12 international patents, as well as a Fortune 500 customer  
13 base for industrial and airports.

14           Additionally, we do a lot of research and  
15 development. Consulting work is one of the primary sources  
16 of business for ECotality. We've been a primary contractor  
17 of the U.S. Department of Energy for the last ten years.

18           We like to joke that we're somewhat like Noah's  
19 Ark in the fact that we get two of every advance vehicle  
20 before they come to market, where we run these vehicles for  
21 over 150,000 miles, doing advanced dynamometer and battery  
22 testing for these cars.

23           To date we have over 10 million miles of testing  
24 on over 200 advanced vehicles that include plug-in hybrids,  
25 electric vehicles, and fuel cell vehicles as well.

1           So eTec's main strength really comes with Powell  
2 Electronics. We have extensive research and development  
3 capabilities engineering electric drive systems.

4           The company, as I mentioned earlier, dates back to  
5 1989.

6           We help pioneer, along with Aerovironment, along  
7 with some of the other fast-charge providers, fast-charging  
8 technologies in the mid-1990s. Our technology was actually  
9 developed for specifically on-road electric vehicle  
10 applications.

11           Unfortunately, as we were about to bring this  
12 technology to the market, a lot of these cars got taken off  
13 the market, so our company had to adapt, we had to find new  
14 applications for fast charging. At that point the only  
15 electric mode of applications out there were industrial  
16 applications, material handling, lift trucks, forklifts,  
17 pallet jacks, as well as airport ground support equipment.

18           I've already touched briefly on the AVTA activity  
19 that we do with the Department of Energy.

20           Other activities we do is we do a comprehensive EV  
21 infrastructure program, we call that the EV Microclimate  
22 Program, which I'll talk a little bit more about later on in  
23 this presentation.

24           But one thing that I think separates us from some  
25 of the other presenters up here is that we believe that a

1 rich charge infrastructure will mostly be comprised of level  
2 II and level III charging. If we have level II charging  
3 systems in the market right now, a lot of the two-wheel and  
4 three-wheel vehicles we hope would be compatible, we hope  
5 that they meet national electric code and should be able to  
6 charge using a typical level II connection.

7           We do extensive amounts of battery performance  
8 testing, we have a very strong relationships with the  
9 Advanced Lead Acid Battery Consortium. We do extensive  
10 battery cycling and development.

11           And we've also had a long history in hydrogen.  
12 We've done some of the most advanced hydrogen infrastructure  
13 systems in the country. We did the APS Hydrogen Park, which  
14 is used as a safety standard around the world for hydrogen  
15 infrastructure facilities.

16           We also worked closely with Rauch Engineering and  
17 Ford to create hydrogen internal combustion vehicles, the F-  
18 150, as seen here.

19           So our minute charger system, as I discussed  
20 earlier, was developed primarily for on-road electric  
21 vehicle applications. We had to adopt that to new  
22 applications when these EVs got taken off of the road ten,  
23 15 years ago.

24           Again, we currently are servicing the airport  
25 industrial markets and we are looking to use this technology

1 and modify it for the on-road applications.

2           Some of the advantages here with transferring to  
3 electric and fast-charging for industrial and GSE is that it  
4 reduces the annual fueling costs by about 70 to 80 percent,  
5 especially in GSE, you no longer have the need for diesel,  
6 or LPG in your material, your baggage tractors, your belt  
7 loaders, the like.

8           Our systems right now, we use an IGBT design which  
9 makes them 50 to 65 percent smaller than some of our  
10 competitors, as well as 50 to 70 percent lighter, which  
11 means that we're able to take a fast-charging system and  
12 pole mount that.

13           When we start to use this charging technology for  
14 on-road applications, the small footprint and the light  
15 weight is really going to come in handy here as we make  
16 these, I guess, sexier consumer applications.

17           So some of our charge infrastructure experience,  
18 we've actually installed more chargers than any other  
19 company right now to date. You had over 400 EV chargers  
20 installed for the original GMEV-1s, we did the majority of  
21 installations here in California, as well as Arizona.

22           We've set these up in the residential, commercial,  
23 and public locations.

24           You'll see up on the Power Point there, on the top  
25 right there is an installation we did for the U.S. Postal

1 Service.

2           Down in the bottom left is an installation that we  
3 did at the Biltmore Fashion Square, one of the major malls  
4 in Arizona. During the original round of EV-1s we installed  
5 charging systems at all the major high population areas,  
6 which at the time were movie theaters, shopping malls, strip  
7 malls, the like.

8           Recently we were awarded the 99.8 million DOE  
9 award, and I'll talk a bit more about this later on. But,  
10 really, that's going to be a data collection project which  
11 is going to have a big impact, we think, on the EV industry.

12           Some other infrastructure that we have done in the  
13 past, we help different regions, different states, different  
14 municipalities in procuring grants. Currently, we're  
15 working with about five different states to help them  
16 procure some of the Federal funding opportunities that are  
17 out there.

18           We bring together and coordinate local utilities  
19 and government agencies. I think that's one of the reasons  
20 why we're speaking here today.

21           We believe in a holistic approach to  
22 infrastructure. As an infrastructure provider, our job is  
23 not just to manufacture EVSE and give it to people, it's our  
24 job to make sure that there's a market for this EVSE as  
25 well. That means that making sure that building codes, that

1 provisions such like they have in Vancouver which, or that  
2 they're also enacting right now in Washington, in which  
3 they're making sure that all single- and multi-family  
4 dwelling garages make the proper allocations to have the  
5 circuitry for EVSE to be installed in that garage.

6 We think that by doing common sense types of  
7 policies like that, it will help greatly reduce  
8 infrastructure costs and the installation costs.

9 Back in the mid-nineties, here's some examples,  
10 some more examples of some of the chargers that we have put  
11 out in the field. You'll see some of the EV station  
12 features. This was obviously a generation one product, but  
13 this was kind of the most cutting edge at the time.

14 It had access, secured access with the RFID cards,  
15 had data monitoring, it had a 24-hour call center.

16 Bumper guard ADA compliant. This, at the time,  
17 had all the bells and whistles, and you'll see that right  
18 now companies, like Coloumb Technologies, A Better Place  
19 were pushing that envelope a bit further.

20 That the user functionality for this next  
21 generation of chargers is going to be much more robust than  
22 we're used to having.

23 We didn't have the ability to program a charger on  
24 our phone back in 1995 because my phone was the size of a  
25 brick. Actually, I didn't even have a phone at that time.

1           This time around we have Smart Phones, we have i-  
2 Phones, we have Smart Grids being put into place that are  
3 really going to change the dynamic of this industry.

4           We believe that the era of the dumb charger may be  
5 over, that the new chargers that we're going to install are  
6 going to be smart, intelligent chargers to meet some of the  
7 utility demands and the demand response applications.

8           So some of our current products that we have,  
9 you'll see that we have extensive portfolio of products for  
10 industrial and airport applications.

11           The top two, the PJ and the SC are designed for  
12 industrial applications. They're some of the smallest  
13 profiles on the market or footprints on the market.

14           Down on the left you see a GSE 300, I believe,  
15 which is what we use for airport ground support equipment.  
16 If you fly out of Oakland Airport anytime soon, you're  
17 flying Southwest, your push-back tractor, which is a 35,000-  
18 pound push-back tractor that can stop an airplane, we power  
19 that. It is one of the most critical applications they have  
20 and they trust our fast charging for -- over 12 years, now,  
21 we've had airport support equipment there being fast  
22 charged. We're in 14 different airports across the country.

23           Right now we're also developing our next  
24 generation of level II and level III charging systems. We  
25 believe that these are going to all be J1772 compatible.

1           We're lucky, as David said before, that this time  
2 around we have all of the major automotive manufacturers  
3 onboard with a common connector, communications, and plug,  
4 which really is going to cut down on a lot of the problems  
5 we had in the initial go-round, and allow us to create a  
6 universal charge-up infrastructure.

7           We expect our initial products to be unveiled in  
8 the second quarter of 2010, which is also the same time we'd  
9 expect to be installing these as part of our program.

10           Here are a few concepts of fast-charge systems.  
11 Again, having one of the smallest and the lightest profiles  
12 on the market, we're able to make these charging systems  
13 look similar to a gas station, like a gas station will look  
14 today.

15           We believe that major retailers are going to be  
16 some of the key adopters of this fast-charge technology.  
17 The dollar fifty a charge to get people in a store for 15  
18 minutes is very valuable.

19           In most urban locations, you know, people live in  
20 apartments and high rises, fast charging may be one of the  
21 only options they have. Obviously, there will be plenty of  
22 street-side charging available as well, but for many people  
23 we believe that fast charge will be one of the great  
24 enablers for electric transportation.

25           We also believe that electric vehicles allows us a

1 unique opportunity to change the way we think of fueling  
2 infrastructure. No longer does a gas station become a  
3 destination spot. We want people to charge where they  
4 normally go, where they live, where they work, where they  
5 play.

6           If you shop at a supermarket for 15 minutes a  
7 week, that may be a great time to top off.

8           In urban areas you may be using fast charging  
9 really as a way to top off from location to location.

10           When you start talking about electrifying  
11 transportation corridors, then you're probably looking  
12 anywhere, about a 26-minute charge is what Nissan's claiming  
13 on the Leaf. We believe we could possibly do that faster.

14           But those are now destination spots in which  
15 people stop, they use the restroom. If they have kids,  
16 you're obviously making the stop every hundred miles, you  
17 can purchase your soda, get your cup of coffee, and get on  
18 the road.

19           So as I discussed before, we take a very holistic  
20 approach to EV infrastructure. We've developed what we call  
21 our EV Microclimate Program. This really ensures that areas  
22 are plug-in ready.

23           There are a lot of programs and projects out there  
24 that provide guidelines and provide steps that make an area  
25 plug-in ready; we actually get on the ground and we make

1 sure that there's someone managing that process.

2           And most organizations, if someone's not actually  
3 doing it 24 hours a day, seven days a week the job doesn't  
4 get done.

5           We create turnkey program for utilities, for  
6 municipalities, for cities to make sure that they have the  
7 proper regulatory environment for these electric vehicles to  
8 succeed.

9           We make sure that when we do this process one of  
10 the first things we do is we do an EV roadmap process. This  
11 is a strategic blueprint and action plan for the area, we  
12 pull together all the key stakeholders. This is more than  
13 just the utilities. These are the local governments, these  
14 are the utilities, these are the large commercial real  
15 estate developers, these are the major employers, the major  
16 businesses. We need to get the community on board for the  
17 community to embrace this.

18           We can then go through and do a detailed roadmap  
19 action plan, we layer on some of the electric utility  
20 infrastructure requirements. We find the highest traffic  
21 areas, some of the most highly populated areas. Prius  
22 penetration is a great way to look at where potential  
23 markets will be for these vehicles.

24           We take that, we then go back out with those  
25 stakeholders, we ask them what they think of this, we get

1 their input.

2           Because the bottom line is we may know a lot about  
3 infrastructure, we don't have all the answers, and we  
4 certainly do not know your area better than the local  
5 stakeholders of your area, so we make sure that their voice  
6 is listened to as well.

7           And from there it begins the actual process of  
8 implementation. I would note, before getting into kind of  
9 actually deploying infrastructure, soft infrastructure  
10 development is one of the priorities here as well. First  
11 responder training, making sure that there's roadside  
12 assistance, dealer training, public awareness campaigns,  
13 government awareness campaigns, these are all part of the  
14 solution.

15           So in a sense we really see ourselves kind of at  
16 the middle, as the glue, which helps meets the needs of the  
17 manufacturers, the EV owners, the utilities, policymakers,  
18 and charger operators.

19           And ideally the microclimate is kind of as  
20 follows, and I'll kind of go around in a clockwise fashion  
21 here. At the top you see -- well, it looks like it's from  
22 the Simpson's, but it's actually supposed to be a demand  
23 control center for a utility right there.

24           We really believe that charge infrastructure needs  
25 to be well in line with the incentives and the initiatives

1 of utilities for demand and load management, demand response  
2 and load management.

3 To the right you'll see a typical commercial  
4 installation, where this could be a WalMart, or a Target, or  
5 a supermarket in which you have charging available out  
6 front.

7 We've highlighted the next slide over. The Smart  
8 Meter in someone's home, we believe that integrating a EVSE  
9 with the Smart Meter, making sure that the EV owners can  
10 control their time of use, making sure that utilities can  
11 influence that time of use is extremely important.

12 Down below there's a retail location of a gas  
13 station -- or a fast-charge station. We've included at the  
14 bottom there some street-side parking, which looks very  
15 similar to what Coloumb Technologies does, and we believe  
16 that's going to be a very strong solution in areas that  
17 adopt this type of technology.

18 And then obviously, on the left, you see a large  
19 employee parking.

20 We agree that most people need to charge where  
21 they sleep at night and where they work. Really, your car  
22 is parked 22 out of 24 hours a day there, the other two  
23 hours probably being church for most Americans.

24 So we recently received \$99.8 million for the  
25 Department of Energy for transportation electrification. We

1 are going to be deploying 4,700 cars, Nissan Leafs, in five  
2 states. Roughly going to get about 900 in most areas, some  
3 areas will get more. We have 11 different cities right now  
4 and that's actually drastically expanding. You'll see in  
5 some places we had the San Diego region, or the Seattle,  
6 which is the Puget Sound region.

7           Each day we have new cities coming to us, asking  
8 to be part of this program.

9           As an overview, it's \$99.8 million in funding from  
10 the DOE, it is a 50/50 cost match. Most of our cost match  
11 is coming from the direct sale of the vehicles.

12           In exchange for purchasing a Nissan Leaf and being  
13 a part of the program, we install a data monitoring system  
14 on the car so we understand what the driver, EV driver's  
15 usage patterns are, especially where they are using the  
16 infrastructure.

17           The purpose of this program is very much data  
18 collection. Today there's been a lot of questions as to how  
19 do we roll out infrastructure, how do we bill for  
20 infrastructure, where do we know where to build it?

21           We're hoping that this project answers most of  
22 those questions.

23           You know, we have been involved in almost every EV  
24 initiative to date, we consider ourselves to be experts, but  
25 in no way do we know all the answers here, I don't think

1 anyone knows all the answers.

2           We know where a lot of land mines lay and our goal  
3 is to avoid those but, really, this is about data  
4 collection. We chose our five different markets or our 11  
5 different cities, A, because they have a very favorable  
6 consumer demographic for purchasing these cars but, B,  
7 because they're all very different.

8           We want to understand how the vehicle usage, how  
9 the infrastructure usage differs from different  
10 topographies, from different climates. These are  
11 necessary -- and from different urban areas.

12           If we want electric transportation to spread  
13 across the country, to spread across the world, these  
14 questions need to be answered and they need to be answered  
15 now.

16           So as I said, we're deploying 11,210 charging  
17 stations, 4,700 of them will be residential, for in exchange  
18 for providing us the ability to collect data off your car,  
19 you'll get the free EVSE Level II installed in your house.  
20 This will cover all of your hardware and installation cost  
21 for those that sign up for the program.

22           So 4,700 of those chargers will go directly into  
23 the residences.

24           6,250, the remaining of those level IIs, will be  
25 distributed amongst the five markets.

1           We kind of broke that down and on average you're  
2 getting about 900 vehicles per market, you're getting about  
3 2,050 level II chargers, and you're getting about 40 level  
4 III chargers in each area.

5           With the 8 million from the California Energy  
6 Commission, these numbers in San Diego have been increased.  
7 We are proud to say that California and San Diego,  
8 specifically, truly will be the leader in EV infrastructure,  
9 and they'll have the most robust, most mature, the richest  
10 charging infrastructure in the world.

11           There will be at least a thousand vehicles, Nissan  
12 Leaf vehicles deployed in the San Diego region. There will  
13 be 2,350 level II chargers deployed, this includes both the  
14 home installations, as well as the public and commercial  
15 installations. And there will be 60 level III chargers  
16 provided in the San Diego region, 50 of those chargers will  
17 be going directly to San Diego County, and to ensure that  
18 those people do not have range anxiety, that they have a way  
19 to conveniently fill up on the go. And another ten would  
20 also be used, ten fast chargers will be used to deploying  
21 what we call EV corridors. We're looking at I-8, we're  
22 looking at I-5, trying to connect San Diego to other areas  
23 that are going to have EV infrastructure.

24           In Phoenix and in Tucson we're going to have a  
25 rich infrastructure, so that I-8 corridor, and possibly the

1 I-10 corridor makes sense.

2           South Coast Air Quality Management, AQMD, I think  
3 it's called, they also have received substantial amounts of  
4 funding in their region to deploy plug-in hybrid electric  
5 vehicles and infrastructure. So we need to make sure that  
6 there are no holes in the dataset. We want to work closely  
7 with them and, if we can, try and connect San Diego to Los  
8 Angeles.

9           With A Better Place, we really adopt their  
10 approach in saying that infrastructure needs to be built out  
11 in the densest population areas, the places that are going  
12 to adopt these cars first and have the biggest penetration,  
13 and from there connect them to other population areas, so  
14 San Diego to Los Angeles.

15           In Oregon there's Portland, Eugene, Salem,  
16 Corvallis, as well as Seattle. We're also looking at an I-5  
17 corridor up there.

18           A bit about project schedule, we were awarded the  
19 contract on October 1<sup>st</sup>, we were the only funded program  
20 under electric transportation to be funded and fully  
21 contracted by October 1<sup>st</sup>.

22           This has been a top priority of the Obama  
23 administration and, specifically, the Department of Energy.

24           Our first step, first and foremost, is to do, to  
25 enact what we call the EV Microclimate Program. We need to

1 go through, we need to have an extensive road mapping  
2 process. We need to bring together stakeholders, we need to  
3 get input from the community.

4 We've launched a site called the EVproject.com,  
5 which allows people to go online, see where many of the  
6 Coloumb charge stations are, see where the old generation  
7 one charging stations are, and suggest where do they want to  
8 install a charger.

9 We want the public's input. We want to know, if  
10 you're going to purchase a car and where you want us to put  
11 infrastructure. So we expect that process, setting up  
12 regional offices, to take about six months.

13 In the gain of Q-3 of 2010, we're probably looking  
14 around June, early June, we're hoping to deploy the first  
15 infrastructure in each of the five markets.

16 We hope to have the majority of infrastructure in  
17 place in these markets before the vehicles get launched, the  
18 Nissan Leaf vehicles, in the November/December time frame of  
19 2010.

20 From there we're going to assess for the next six  
21 months who's purchasing these vehicles, what employers have  
22 large fleets of these cars. Again, we want to make sure if  
23 you have employees that have many of these vehicles, that  
24 they can charge at work, so we're going to make sure we  
25 allocate some of those chargers for those employers, for

1 those key pockets of the population that we may have  
2 overlooked in the initial deployment.

3 By Q-2 of 2011, this is really about a six-month  
4 period, we hope to have all 11,210 chargers deployed and all  
5 4,700 vehicles deployed. We want the first cars on the road  
6 and the first infrastructure be used and have at least 24  
7 months of data collection.

8 Q-3 2012 we expect the project to end and then we  
9 will be doing some data collection and analysis on the  
10 remaining data, we'll be publishing our reports quarterly  
11 and sharing that with interested parties. Again, the  
12 purpose of this is education.

13 So a bit more on residential, we're looking at  
14 approximately 900 to 1,000 Nissan Leafs in each market.  
15 People can sign up online at Nissan.com, they can sign up on  
16 the EV project, they can also sign up at the Nissan dealer.  
17 The most important fact is they need to purchase the Nissan  
18 Leaf. Once they do that, they'll be provided the ability to  
19 opt in. We believe that the savings on hardware and  
20 installation costs is a very compelling value proposition  
21 for them to be part of the program.

22 At the end of the program they'll also be able to  
23 retain all the infrastructure that they had installed.

24 In addition to that, we're going to have about  
25 approximately 900 to 1,000 level IIs.

1           Actually, let me retract that. This level II  
2 infrastructure that we're putting in, as we discussed  
3 earlier, it's going to be Smart infrastructure. We believe  
4 that having revenue grade meter inside the box may be  
5 important just so that we can understand what issues are  
6 coming down the pipeline and preempt any of those.

7           I think there's a lot of issues around taxation of  
8 EVSEs if these catch on in popularity. I think there's also  
9 issues around utilities wanting to separately bill for the  
10 electric vehicle electricity that's being used. So  
11 providing a revenue grade meter inside of the box helps meet  
12 a lot of those demands.

13           Internet data collection will be used. We would  
14 ask that people in the program have a wireless internet  
15 connection so that we could transfer data periodically.

16           We're also working with partners, like Cross  
17 Country, TX, telematics providers, and possibly using  
18 systems inside the vehicle to help transmit data as well.

19           Our main project partners on this is GridPoint,  
20 who's helping us out with demand response, and Bovis Lend  
21 Lease, who's going to help us out with the installation.

22           Obviously, these are a lot of chargers to install.  
23 We do R&D, we do engineering and hardware. We are a  
24 licensed contractor in about 20 states, but this may be  
25 something that we're going to have to study and decide

1 whether this is something that we need to do, or whether  
2 companies like Bovis Lend Lease, the largest construction  
3 management firm in the world may be best equipped to handle  
4 it.

5           Commercial infrastructure, again, it's roughly  
6 12,050 level II EVSE in each market. That number is  
7 somewhat changed. This is based off our initial proposed  
8 project, but it's closer to around a thousand right now.  
9 Again, this is going to be revenue grade meters. We want  
10 them to be fully integrated with the utilities' demand  
11 response.

12           We're looking at different revenue systems. We  
13 believe that as an industry we need to be -- have our arms  
14 open. We're on the forefront right now of what could very  
15 much be a revolution and we can't all go about and develop  
16 these solutions behind closed doors.

17           We've brought in Coloumb Technologies here as a  
18 very strong partner, they have a very unique revenue and  
19 building model that we would like to experiment with. We  
20 think that their street-side charging is a very viable  
21 solution and we'd like to understand if a utility or a  
22 municipality would like to implement that solution, if  
23 that's an option available for them.

24           There's not one-size-fits-all for infrastructure.

25           Some of the employer locations will be tied to the

1 vehicle sales, as I mentioned earlier. CB Richard Ellis is  
2 one of our project partners, they're the largest manager of  
3 commercial real estate. And again, Bovis Lend Lease will  
4 help us with the installation.

5 I think I've covered that one a little bit.

6 Fast chargers, we're going to have 260 total level  
7 III chargers installed amongst the five areas. As I said  
8 before, the San Diego region of Southern California will  
9 have at least 60 of these. It's roughly going to be between  
10 40 and 50 in each other market.

11 The telematics interface will provide us status on  
12 the price, will provide us information on the availability.  
13 Again, this is generation two.

14 You will be able to look at your Blackberry, your  
15 i-phone, you name it, to make sure that you know where is a  
16 charger, where it's available, whether it's in use, whether  
17 it's in order, and possibly even raise your hand and get in  
18 line so you don't have to wait at one of the chargers.

19 Some of our project partners here are Bovis, CBRE,  
20 Cross County ATX, with their telematic solutions, as well as  
21 British Petroleum America. BP, which operates all the  
22 AM/PMS, the Arcos, are initially helping us out with  
23 strategic planning and site selection, but we're also going  
24 to be in discussion with them about possibly trying out some  
25 of these solutions in some of their stations.

1           The last thing is data management analysis.  
2   Vehicle and charging utilization is the main goal of this.  
3   We want to make sure that these 4,700 cars will help lead to  
4   the deployment of the next 4.7 million cars, making sure  
5   that we have an open platform of data, that we can share  
6   this with the relevant communities, relevant municipalities  
7   is one of our top priorities.

8           Idaho National Lab, Ohio State University,  
9   GridPoint, UC Davis are all project partners in helping to  
10   collect and analyze this data.

11           There will be quarterly reports on the progress of  
12   the project. That will be disseminated, I believe, through  
13   the Department of Energy's website.

14           Go from there, the lessons learned is going to be  
15   pivotal here in making sure that we deploy infrastructure  
16   effectively.

17           Part of this whole process is understanding how  
18   can we minimize the cost to the taxpayers, how can we create  
19   an infrastructure that is sustainable economically, and not  
20   purely dependent upon handouts. The retail, the commercial  
21   locations those are great ways to figure out what models  
22   work. Is free charging going to be free, is that really  
23   viable? We need to understand that.

24           Again, some of our project partners, there's over  
25   40, over 40 project partners. We have about 14 or 15

1 different utilities that represent over 42 million service  
2 customers. We have three different state organizations,  
3 about 11 different cities, 25 regional or strategic industry  
4 partners.

5 On a last note, I wanted to address some of the  
6 questions that the CEC helped provide or asked us to  
7 address. I know this is somewhat rambling here.

8 We believe that the cost per installation is going  
9 to vary drastically by type, especially by volume as well.

10 Commercial and multi-family installations will  
11 probably be more expensive than single-family residential  
12 installations.

13 We believe that initially a lot of the volume is  
14 going to be dictated by the vehicle penetration. We believe  
15 that 1.5 public or commercial chargers per car is a strong  
16 initial ratio to deploy commercial infrastructure in line  
17 with the vehicle deployments, so that we have that rich,  
18 mature charge infrastructure when first they have these  
19 cars.

20 If first adopters don't have a successful  
21 experience, the industry doesn't have a successful  
22 experience.

23 That ratio will quickly diminish to zero once we  
24 have a quote/unquote rich infrastructure in place.

25 We think that the needed steps to create this are

1 what we've encapsulated in our EV Microclimate Program, the  
2 road mapping, the stakeholder awareness, the first soft  
3 infrastructure deployment, the like.

4 As for incentives, we believe that making sure  
5 that infrastructures are smart, not dumb chargers with an  
6 on/off switch, but smart chargers is going to be very  
7 critical to meeting the utility needs, meeting our energy  
8 demand needs, and also meeting the functionality that  
9 consumers expect this day and age.

10 We think that possible incentives to upgrade to a  
11 smart charger would be -- possibly be an approach that the  
12 PUC and the CEC could investigate.

13 We would estimate that the costs of about 50 --  
14 \$500 to be a premium of smart chargers of dumb chargers.  
15 Maybe not dumb, but maybe normal, regular chargers.

16 We believe that the total installed costs of smart  
17 EVSE could run from 1,500 to 2,500 dollars for the hardware  
18 and the installation.

19 Level II charging hardware's going to become a  
20 commodity, it's going to become a commodity very soon. Some  
21 of them are asking that we provide these level II chargers  
22 as low as \$500. To meet that, obviously, there's volume  
23 requirements.

24 But we need to reduce the cost to a residential EV  
25 purchaser as much as possible for the industry to succeed.

1 Further incentives would be incentives for  
2 commercial Smart Grid fast charging. Fast charging, as our  
3 friends from Aerovironment discuss, is a very expensive  
4 proposition, you're looking at around 30 to 35 thousand  
5 dollars for the car, another 10 to 15, or possible 20  
6 thousand dollars for installations.

7 Some commercial facilities are already prewired,  
8 most Wal-Marts and Targets are. But perhaps putting in  
9 incentives to address the Smart fast charging may be another  
10 strong approach.

11 And I believe that's about the extent of our  
12 presentation. You know, I would just kind of add on here  
13 that this project is very forward looking, it's one of the  
14 most progressive that the world's seen to date.

15 We assume a lot of leadership here and we thing  
16 that whatever chargers we use, the functionality that we  
17 implement in this initial trial is really going to set the  
18 standard for the rest of this industry to follow, and so we  
19 take that position respectfully, but are also prepared for  
20 the hard work that we have at hand, and we look forward to  
21 working very closely with not only the PUC, the CEC, but all  
22 of the rest of the infrastructure providers and solution  
23 providers at this panel today. Thank you.

24 MS. BAROODY: Thank you, Colin.

25 (Applause.)

1 MS. BAROODY: Question?

2 MR. OLSON: Yeah, Colin, I have a couple of  
3 questions. Could you elaborate on or clarify, the total  
4 cost for your project in five states, \$207 million, and  
5 about half of that government incentives. The remainder of  
6 that, is that --

7 MR. READ: We've been allotted \$99.8 million from  
8 the DOE for this project. That 99.8 is directly cost  
9 matched by our project partners. When you purchase a car  
10 and you sign on to share your data and be a part of the  
11 project, you become a project participant.

12 And that cost which the people provide for their  
13 vehicle, the costs that they will spend for charging their  
14 car at home, some of the costs that are being spent to  
15 install these chargers at premium locations will all be part  
16 of the cost match associated, so that 99.8 is also matched.

17 The California Energy Commission has been -- so  
18 grateful, to give us another 8 million for our successful  
19 proposal, which will also be matched in the San Diego area  
20 through similar resources.

21 We're also in discussions -- so that bring the  
22 entire project up to \$207.8, I believe, not including the  
23 California Cost Match.

24 We're also in discussions with various state  
25 governments. The State of Tennessee is actively discussing,

1 they've allotted 5 million towards electric vehicle  
2 deployment and infrastructure. They're looking at providing  
3 incentives for -- further incentives for people to sign up  
4 for this program, as well as additional funding to deploy  
5 more infrastructure. There's three cities there so they're  
6 looking strongly at fast charge.

7 MR. OLSON: So in terms of private money and the  
8 actual installation of the systems, is there any private  
9 money in that?

10 There is. I mean, the private money is all coming  
11 from the actual purchasers, the private consumers that  
12 purchase this vehicle, it's coming from some of our project  
13 partners who are providing money for some of the R&D as  
14 well, and some of the deployment infrastructure.

15 People are providing -- project partners, CBRE,  
16 for instance, is putting up some of their premium locations  
17 at office locations, at retail locations to install their  
18 chargers.

19 MR. OLSON: There was a previous comment about  
20 separating meters or streamlining the permitting process,  
21 and that meant not having separate meters, meaning that  
22 there's a time factor in that installation that is preferred  
23 to get down to one day. Any ideas on how you do that? I  
24 mean, how do you keep -- it seems to me that you're going to  
25 trigger tier II, tier III pricing if you don't have a

1 separate meter.

2 But what's the -- any way of reducing the time  
3 frame for installation?

4 MR. READ: Well, we think that the building codes  
5 is kind of our first step, making sure that the single-  
6 family dwellings, that the garages for most residential  
7 dwellings have provisions, whether that's a dedicated 240  
8 volt circuit, or whatnot, so that the actual installation  
9 costs get knocked down tremendously.

10 I'll be the first to admit that I'm not the most  
11 technical in this field. Kevin Morrow and Don Conner are  
12 the principals of the company. Don is actually traveling  
13 and Kevin had an issue in the family, which he's unable to  
14 attend.

15 But I know that one of the issues that they are  
16 currently discussing is possibly using the installers to be  
17 certified, installers to permit it as well.

18 As mentioned before, the last thing we need is for  
19 someone in the City of San Francisco to be able to install a  
20 charger in seven days, but someone in Tiburon to take seven  
21 weeks to have a charger installed, and for a much greater  
22 cost, making sure that those installation costs are  
23 consistent throughout areas and making sure that the  
24 installation period goes from perhaps four weeks to perhaps  
25 four days are things that we're looking to address.

1 MR. OLSON: Okay, thanks a lot.

2 MS. BAROODY: Thank you very much, Colin.

3 MR. READ: Thank you.

4 MS. BAROODY: Well, I think we're probably all  
5 ready for lunch, so our three morning panelists have agreed  
6 to come back at 1:30, 1:35, or 1:40. Let's see, we'll do  
7 1:35, so we'll take an hour now for lunch.

8 And then we have a little more time in the  
9 afternoon so that should work out. Thank you.

10 (Off the record for the lunch break.)

11 --oOo--

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AFTERNOON SESSION

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MS. BAROODY: Okay, I'd like to introduce Mark Aubry, with Smith Electric. Are you ready? Oh, we're not ready, we're almost there.

Okay, I think we're ready now. Mark Aubry, Smith Electric.

MR. AUBRY: Okay, I don't know if everybody's back yet, but we'll get the process started for the afternoon session.

We're glad to have everybody here and certainly thank Leslie, and Peter, and Tim, and PUC for allowing us to be here, and the audience this afternoon.

I'd like to take the opportunity to give kind of an overview of Smith, we're the only OEM that's representative on this panel, so I think that's kind of unique. But I'd like to give a quick overview of Smith, some of our products quickly, and then our rollout, and certainly seeing that we're talking about infrastructure, some of those basic needs.

Talking about Smith, a lot of you may or may not know who Smith is. We have spent the last 24 months soliciting partnerships with a number of key corporate launch partners with a significant California presence, they have a lot of urban transportation and logistics operations that are based here. They are, most of them, as you see in

1 those representative companies that's just a small handful  
2 of them, those will be some of the first products and first  
3 companies that will have vehicles in the California market,  
4 as well as across the nation, and we are strategically  
5 placing them in -- trying to place them in the San Francisco  
6 Bay Area.

7           Ultimately, what we are working with is committee  
8 partners on leveraging the maximum level of matching program  
9 funds and in-kind contributions to ensure that our rollout  
10 is met with successful cooperation and with both willing and  
11 well-funded collaborators.

12           And I'll go into some of the DOE funding that  
13 we've got coming up, in just a second.

14           As you can see from this next slide, some of the  
15 right history that we've got out there, all we've ever made  
16 is electric vehicles. And if you start in the top left-hand  
17 corner and work your way around there is the original  
18 company that we started with is Northern Coach Builders, and  
19 back then all we ever made was products from the ground up.  
20 Today, certainly, we don't do that, there's a lot of other  
21 products that we make and it's a lot easier and a lot less  
22 expensive, a lot of less expensive products that we put  
23 together.

24           Talk a little bit about the Smith mission stand  
25 point, really three areas. The bridging the gap, as we like

1 to call it, in the development stage, where hybrids used to  
2 be five or six years ago, now they're widely accepted. We  
3 really feel strongly that battery electric commercial  
4 products and OEMs, as they come online, are in this phase  
5 that really needs to bridge the gap, and that bridging of  
6 the gap to where the herd will readily accept them is a  
7 finite amount of time.

8           And we feel that the place to do that, in this  
9 case today because of timing, because of infrastructure,  
10 because of those who are willing to accept it is the  
11 commercial fleet market.

12           When you look at the technology and legislation  
13 driving the cost down, we are clearly working with the  
14 utilities in every market, and that utility partnership with  
15 the independent systems operators, with the, in this case,  
16 California Energy Commission, California Air Resource Board,  
17 and a number of the individual infrastructure companies that  
18 were here today, trying to drive down that technology, and  
19 the legislation, and ultimately getting the cost down.

20           We see today trucks, in the commercial fleet  
21 application, as being a first entrance point, then to have  
22 busses come into the market, and ultimately to have cars.

23           Our first product is the Smith Newton, that is  
24 online today in production in our Kansas City, Missouri  
25 facility. That is a vehicle that will go up to 26,000-pound

1 gross vehicle weight. Although that's a box truck that you  
2 see on the picture shown, through DHL, we make anything from  
3 a dump truck to a aerial truck, to a flatbed. Really,  
4 whatever you would put on a diesel equivalent, that's what  
5 could be put on the back of the Newton.

6           From a infrastructure stand point, the 220 volt,  
7 50 amp three-phase, or level II charging is what we would  
8 need on that vehicle. And as I mentioned a second ago, all  
9 the infrastructure companies that have been represented here  
10 this morning, we have had conversations with them, and  
11 dependent on the market and dependent on the needs we are  
12 working with them to determine the right application.

13           Next year, in early 2010, we are working with Ford  
14 on the transit connect platform. As you may know today that  
15 that vehicle is out in gasoline version, that came out in  
16 July, we are working on that product as a all-electric  
17 vehicle. Certainly, the infrastructure needs for that are a  
18 little bit different in that it only requires single phase,  
19 and the operator has a little bit of a variety of needs, so  
20 we'll have a little bit different infrastructure.

21           But that will certainly be a very credible product  
22 and we have had that product in production in Europe for the  
23 past number of years, and under Smith UK has been a  
24 fantastic, well-received product there and we're excited to  
25 bring it into the market here, in the U.S.

1           Certainly, the right applications, I don't think  
2 that's anything really too critical to share with everyone  
3 in the audience today, but if you don't put the right  
4 vehicle with the right customer, and the right application,  
5 you're going to have a failed product.

6           So certainly those ones on the right-hand side of  
7 the screen is what we would go after and look for as the  
8 right customer, spend a whole lot of time on that.

9           What we have tried to do also, on our first  
10 product, is take the vehicle and give a variety of different  
11 applications, at the same time, in order to keep costs down,  
12 bring a variety of battery configurations. So if you only  
13 need to go 40 miles, why have a one-size-fits-all battery  
14 pack. So we go anywhere from 75 miles all the way up to,  
15 really, 160-kilowatt, if you're driving a utility bucket  
16 truck that will give you the 150 miles on a single charge.

17           Certainly, from these three key areas are the ones  
18 that we are primarily focusing on, driving out costs.  
19 Ultimately, today, day one, regardless of what your capital  
20 expenditure is, that operating cost is significant --  
21 significantly reduced.

22           That urban delivery or that urban cycle of any of  
23 these companies that we are working with is critical from no  
24 noise, no vibration, quick acceleration, but then even an  
25 actual day-to-day driver that's using these vehicles love

1 them more than their diesel equivalent, their diesel  
2 partner. And certainly, zero emissions is a critical piece  
3 for any city that's involved.

4 I won't spend a whole lot of time on the  
5 engineering components of the Newton. We put them on there,  
6 some folks like to see all the individual pieces that make  
7 up the Newton.

8 Going back to the DOE amount of money that we  
9 received, we put in for significantly more than what we got,  
10 but we were excited that we received a \$10 million grant,  
11 which ultimately turns into to be a \$20 million project.  
12 That is in full succession today.

13 We were also awarded a number of Clean City Grants  
14 across the nation, which we have a number of our partners  
15 putting in their vehicles and rolling out, ultimately  
16 through Q-1, Q-2, through Q-4 of 2010.

17 Underneath that incentive opportunity you see the  
18 individual vehicles that we put there, plus there will be  
19 others. The way we have worked it out is that there will be  
20 a \$50,000 usage fee donated, in this case, by Department of  
21 Energy as a cost-sharing perspective. They want the data,  
22 we want the data.

23 I know from an energy perspective, everyone wants  
24 the data that is coming off of these. So that \$50,000 usage  
25 fee will be given to each program participant for every

1 vehicle that's ordered and in return we would have the data  
2 coming back from that.

3 Certainly, some of these states, California,  
4 Texas, Colorado, and Arizona are some of our initial states  
5 that we will be working towards, as well as trying to push  
6 up the amount of incentive on tax dollars that we are  
7 working with. Not just the \$7,500, but to push it up to a  
8 \$12,000 tax credit.

9 I won't say much about that particular slide,  
10 outside of being -- our sales being an industry leader and  
11 first to market, as well as the companies that we are  
12 working with.

13 Ultimately, from a mission stand point, our  
14 driving efficiencies, driving costs down, leveraging volume  
15 to be able to do that, developing new business models with  
16 the customers that we are working with, with the  
17 infrastructure companies that we had here today and, as  
18 well, the individual cities that we are going through to  
19 ultimately attract the right customer.

20 A few of them you see here on this screen today.  
21 Certainly, these are not all of them, but these are six or  
22 so of our most accredited customers, and I think they each  
23 bring a different perspective, a different drive pattern, a  
24 different customer to the market, and they have certainly  
25 stepped up and not only purchased products and are involved

1 with the DOE, but also want to help us see that the product  
2 is given on time and giving them great success for their  
3 name, and for our name as well.

4 Our Kansas City facility, as I mentioned to a few  
5 people earlier today, it's a 600,000 square foot facility.  
6 We currently take up 80,000 square feet, so there's plenty  
7 of room to grow and we have intentions for doing that.

8 That did come online, delivering product, the  
9 first product rolled out of there September 21<sup>st</sup>, , which was  
10 a few weeks ago, and we have a significant amount of product  
11 that we'll roll through the rest of the year and then early  
12 into 2010.

13 And the last slide that we've got on there really  
14 shows the transit connect, as I've shown already. Staples,  
15 for example their vehicle, DHL, some of our normal long-  
16 standing customers. You see a dump truck that's on there.  
17 We do make busses in Europe and have intentions to bring  
18 those as a fully electric battery -- fully battery electric  
19 vehicle into the U.S. market in 2010.

20 And then certainly the last one, which you will  
21 see running around on the streets of San Francisco in the  
22 not too distant future, is PG&E's all-electric bucket truck,  
23 which is the first not just for the nation, but the first  
24 for the world.

25 So with that, we thank everyone for being here

1 today and thank you for your time.

2 MS. BAROODY: Thank you very much.

3 (Applause.)

4 MR. OLSON: Mark, I have a question, this is Tim  
5 Olson.

6 MR. AUBRY: Yeah.

7 MR. OLSON: Do you consider these projects  
8 demonstrations, these are not really commercial applications  
9 at this point, commercial sales or are they -- how do you  
10 describe them, are they demonstration, are they deployment  
11 of commercial vehicles, what's your --

12 MR. AUBRY: I think how we take them and maybe how  
13 our customers may take them, or how you may take them may be  
14 three different options, so I don't know if there's a right  
15 answer or a wrong answer.

16 For ourselves, we truly, from a customer's  
17 perspective and from our perspective, we would say that  
18 these are not demonstration to see if they work; we know  
19 that they work because they've been in customers' fleets  
20 already up to this point.

21 From a Department of Energy and that money that's  
22 been given, it is for a demonstration of can these vehicles  
23 work, how are they working in this particular atmosphere?

24 In this case, you know, the San Francisco Bay  
25 Area, what applications are they being put in and that data

1 that's received out of it.

2           So I think any of the infrastructure components  
3 that we put in, that will certainly be a demonstration  
4 because up to this point no one in our field has gone out  
5 and done that in mass format, so we need to see how they  
6 work, what they work well with, and so on.

7           MR. OLSON: And are you open to your electric  
8 drive version of this, but for non-petroleum fuel platform,  
9 so that would be more of a prototype demonstration?

10           This is the nature of a solicitation we're about  
11 to put on the street. In essence, we want to go beyond  
12 diesel and gasoline and look at natural gas, maybe ethanol,  
13 pure electric, in essence, kind of hybridizing other fuels.

14           MR. AUBRY: I certainly wouldn't say no to  
15 listening to what you have to say.

16           MR. OLSON: One other question, of your partners  
17 that are kind of the host companies for these vehicles, can  
18 you give us any information, if not today, some information  
19 on how many in California?

20           MR. AUBRY: Sure.

21           MR. OLSON: How many of these would be interested  
22 in California?

23           MR. AUBRY: What we've committed to in 2009 and  
24 early 2010 is 150 vehicles of the Newton platform. We have  
25 not made any public statements for the Transit Connect,

1 partially because Ford's got their hands in that, as well.

2           What we've said publicly is there's a significant  
3 amount more products to be deployed in New York, in Texas,  
4 in each one of those states that I mentioned.

5           But specifically California, on the Newton  
6 platform, a minimum of 150 into 2010, and then once the  
7 Transit Connect comes online it would be more vehicles than  
8 that.

9           But specifically using the Department of Energy  
10 money and the cost matching would be that 150 first  
11 deployment.

12           MR. OLSON: And would you do any of your projects  
13 here in California, would you do any manufacturing assembly  
14 here?

15           MR. AUBRY: Can I take that off the record?

16           MR. OLSON: Sure.

17           MR. AUBRY: No, most of our components are made  
18 here in California. So although the vehicle, itself, is not  
19 assembled here in California, or final assembly is not made  
20 in California, a number of our components are made here, as  
21 well as the work force. I think that would be worthwhile  
22 for us to spent more time and go through, that that will be  
23 the -- that initially will be the phase.

24           And then ultimately where we would see it is  
25 having some representation here in California from an

1 assembly plant perspective. And I think that's where we  
2 would want to go offline with you.

3 MR. OLSON: Okay, thanks a lot.

4 MS. BAROODY: Thanks Mark, appreciate it.

5 Okay, next up we have Bob Hayden with the Bay Area  
6 Electric Vehicle Corridor Program.

7 MR. HAYDEN: That is me, thank you. Good  
8 afternoon, I'm Bob Hayden, I'm with the San Francisco  
9 Department of Environment.

10 Today I'm talking really about the regional  
11 activity we have going here in the Bay Area, and it's going  
12 to be a little bit different nature of a presentation than  
13 what you've heard and we've been talking about so far today,  
14 which is focused and presented from the stand point of  
15 technologies and products.

16 I'm really going to focus on just really more of  
17 process questions, the types of things that we're trying to  
18 make happen here in the Bay Area to deal with the types of  
19 questions, and challenges, and opportunities that we've all  
20 been talking about here.

21 We'll get down, I think, to more specific brass  
22 tacks with the next presentation, with my colleague from  
23 Sonoma County, who will talk a little more directly about  
24 some of the projects that are going on in at least one of  
25 the counties within the region. But I want to give a notion

1 of how we're trying to tie it all together.

2           And in that regard, the first thing I want to  
3 emphasize is that the Bay Area EV Corridor you should not  
4 think of, necessarily, a physical corridor of charging  
5 stations, it's really a project. It's an effort to do just  
6 what that subtitle says there, of bringing together and  
7 creating a network of EV-ready communities.

8           Certainly, it will include corridors and clusters  
9 of charging infrastructure, but that's really only part of  
10 it.

11           The program, itself, has two major legs to it.  
12 One is the Gov-to-Gov Working Group, and you've heard Gov-  
13 to-Gov referred to by a number of speakers already this  
14 morning, Commissioner Chong and some others have mentioned  
15 some of the meetings that we've had through that group.

16           That is a very diligent effort that we've made to  
17 bring together the relevant local county, regional  
18 government officials from the nine-county Bay Area, so that  
19 we have one place where we have all of the permitting  
20 people, the fleet administrators, planners, others who have  
21 some kind of official governmental role that's going to have  
22 an impact on getting the community EV ready in many  
23 different dimensions of what that term means.

24           So that's one effort of getting the government  
25 officials together so that they have a place where, as much

1 as we love the vendors, sometimes we need to be just, you  
2 know, have a little bit different environment to talk, and  
3 think, and scope out what the policy dimensions are.

4 But we do need the private sector collaboration as  
5 well, and that's the second leg of the effort. The private,  
6 the public/private collaborative activity takes places as  
7 sort of parallel effort, and that has started up really more  
8 recently than the Gov-to-Gov activities.

9 But through the public/private collaboration we're  
10 finding a space, a location, a venue, a mechanism by which  
11 we can bring together that government-to-government  
12 representative group with members of the private sector,  
13 both vendors and producers of vehicles and infrastructure,  
14 but also private sector in the sense of large employers,  
15 people who -- companies who can become involved with  
16 encouraging their employees to become involved with electric  
17 vehicle consumption, private fleets and so forth.

18 And also the nonprofit advocacy groups within the  
19 Bay Area, try to bring all of them together.

20 And through those two parallel efforts, really,  
21 that yields the regional planning activity. And that  
22 planning activity you see in an off-centered oval here at  
23 the bottom, and that's intentionally off-centered just to  
24 point out that the bulk of regional planning comes naturally  
25 from the governmental sector, but there is an intersection

1 with and an input to that, obviously, from the private  
2 sector. So that's what we're bringing together through this  
3 collaborative effort through the Corridor Program.

4 As I said, the Gov-to-Gov activity is focused on  
5 just the government officials. I mentioned the nine  
6 counties, on top of that there are three regional agencies  
7 that have been involved, the Bay Area Air Quality Management  
8 District, the Metropolitan Transportation Commission, and  
9 the Association of Bay Area Governments, or ABAG.

10 On top of that we have over a hundred cities  
11 within that nine-county region, and they range all over the  
12 lot in terms of size, and interest, and demographics, the  
13 largest of course being San Jose, Oakland, and San  
14 Francisco, but there are a host of medium and some very  
15 small and rural cities that fit within that nine-county  
16 region.

17 So they're not all going to come in at the same  
18 level and so far we've had about 40 jurisdictions from that  
19 nine-county region that have participated in the programs,  
20 and that's growing all the time. I'm really impressed,  
21 myself, I never thought we would be drawing in that many  
22 from the beginning. I think it's a measure of the interest  
23 and the recognition that this is a time to really start  
24 learning.

25 And learning is a big part of it. One of the

1 things that needs to happen, I have just really, really come  
2 to realize, is not just bringing together the government  
3 officials to compare notes on how to get consistent policies  
4 in place and how to do fleet orders, or something of that  
5 nature, but it is basic education.

6           And the types of things that you are hearing here  
7 today, that we are talking about, is completely new to most  
8 of the local governmental people who have to deal with it,  
9 and there's a great deal of education that needs to take  
10 place.

11           So by the fact that we are bringing these people  
12 together, we're setting up and will be setting up common  
13 websites for them, and areas, meetings, and workshops where  
14 they can learn about specific types of projects is extremely  
15 valuable and I think is going to accelerate the process for  
16 bringing the vehicles into this region.

17           And this region, I just want to emphasize, also,  
18 the importance of this nine-county region, there are more  
19 than five million vehicles registered within the Bay Area,  
20 so we do have, obviously, a sizeable market, in addition to  
21 a very eager environmentally conscious market.

22           As I'm sure you know, this is one of the highest  
23 concentration of Prius markets in the country and any other  
24 measure of consumer interest in environmental products, San  
25 Francisco Bay Area ranks at or very near the top.

1           Within just, again, the structure of the way this  
2 Government-to-Government Committee works, we have pulled  
3 together, on an informal basis, a group of us who serve as  
4 sort of the steering committee, and there are  
5 representatives, including myself and our fleet manager from  
6 San Francisco, but also representatives from Santa Clara  
7 County, and San Jose, Alameda County, Marin County, and  
8 Sonoma.

9           So it gives a good, those of you who are familiar  
10 with the geography, we've covered the basis pretty well in  
11 terms of those who have taken the most active interest in  
12 spearheading the activity.

13           On the private sector side, equally impressive I  
14 think, in terms of the level and number of stakeholders who  
15 are involved with this. The group that has stepped up to  
16 serve as sort of the host for that private, public/private  
17 collaborative meeting ground is the Bay Area Climate  
18 Collaborative.

19           And I'm going to go through a little bit of  
20 alphabet soup here, but the BACC is a relatively new  
21 organization, a new compact that was pulled together by some  
22 of the leading business organizations and some of the  
23 biggest governments within the Bay Area, over the past year,  
24 to work specifically on a variety of climate-related topics.

25           Electric vehicles is one of their identified top

1 areas and they have formed an EV working group. That EV  
2 working group serves as that meeting ground, I'll call it,  
3 for the public/private collaborative activity.

4           The collaborative, that Bay Area Climate  
5 Collaborative, is made up of -- from the business side, the  
6 principal players are the Silicon Valley Leadership Group  
7 and the Bay Area Council. They're supported, also, by the  
8 Business Council on Climate Change.

9           Those three organizations represent, really, the  
10 powerhouses of the business sector within the Bay Area, and  
11 for them to be involved with this gives us a great deal of  
12 horse power for not only sort of bringing about and  
13 providing an advocacy base that we're going to need,  
14 ultimately, for whether it's public policy or anything else,  
15 but it also provides an inroad for us, a pathway back to  
16 some of the major employers throughout the Bay Area.

17           So we're getting input and we're getting an avenue  
18 for going back out into the business community.

19           And there are other major stakeholders who are  
20 involved with this. The Clean Cities Coalitions, of which  
21 there are three in the Bay Area, have been associated with  
22 this whole EV Corridor Program, and supportive of it.

23           We had a workshop. I mentioned that we're doing  
24 educational programs for stakeholders, including the  
25 government officials throughout the Bay Area.

1           Last month we had a workshop in San Jose on  
2 electric vehicle charging, just the basics of how it works,  
3 what it means primarily for fleet operators. That was  
4 sponsored, actually, by the San Francisco Clean Cities  
5 Coalition.

6           And throughout our program we've had tremendous  
7 support from Electric Power Research Institute, and PG&E,  
8 all of whom -- both of whom have provided sort of technical  
9 resource and been informational speakers at our programs.  
10 Bay Area Air Quality Management District has been actively  
11 involved in a variety of ways, one of which ties into this  
12 next item that I want to talk about, which is one of the  
13 obvious areas that the collaborative group, specifically the  
14 Government-to-Government group has been involved with and  
15 will increasingly be involved with, and that's with public  
16 charging.

17           I'll explain how the Air District was involved in  
18 just a moment, but just the whole, the breadth of the  
19 activity in terms of the public charging work that is  
20 beginning to be done, started up over the past year and is  
21 really picking up in acceleration, is looking, obviously, at  
22 the point of upgrading the old generation one chargers,  
23 that's the very easy starting point.

24           But we're working on how to come up with  
25 strategically placing of a new network of level II chargers.

1 And consistent and at the same time with that, coming to  
2 grips with what some of the basic policy questions are, as a  
3 local government there are lots of things that come up once  
4 you start putting public charging particularly onto  
5 publicly-owned property.

6           Is there going to be billing for the electricity?  
7 If so, who collects it, how's it done? How do we make sure  
8 that even if there are prescription systems that it is  
9 universally accessible, and Richard Lowenthal addressed that  
10 this morning. Lots of other issues that may come into play  
11 as we look at this from a public perspective.

12           And it hasn't really until, I would say very  
13 recently, started to sink in, I think, to the planners at  
14 the local level that that public charging also has the  
15 dimensions for fast charging associated with it.

16           Not all DC fast charging is going to be on public  
17 property, but it certainly fits in with the public planning  
18 for how we deploy that infrastructure, so all that gets  
19 wrapped up into what we're doing on the charging side in the  
20 corridor activity.

21           We got immersed in that, really, a little sooner  
22 than I think any of us would have liked, just because of the  
23 timing of the stimulus funding that came out, just at the  
24 time that we were really getting our organizational efforts  
25 together.

1           But when the Clean Cities opportunity came out, we  
2 all raced to put together the types of not only vehicle  
3 procurement, but the charging infrastructure that we thought  
4 we'd like to get funded under that project.

5           We weren't successful, but it was an extremely  
6 valuable process. We didn't get the grant, but it laid the  
7 basis for a lot of things that will be moving forward.

8           The Bay Area AQMD, which I mentioned earlier was  
9 involved with this charging activity, they stepped up to be  
10 the regional coordinator for that grant, so that we did send  
11 in, to the Department of Energy, one regional grant.

12           I'll have to say that the work that went into  
13 putting together that proposal didn't have quite the kind of  
14 elegant planning process behind it that I would have liked,  
15 and I think that we'll have going forward with the luxury of  
16 a little bit more time and experience. But because  
17 everybody had to move so quickly on that, the different  
18 jurisdictions just went out quickly and found the areas  
19 where they thought they wanted to put public charging in  
20 place.

21           We didn't have time to really do thorough studies  
22 of is that the best place, and all of that, but individually  
23 as jurisdictions we came up with our thoughts of where at  
24 least we want to put our marker down for where we're going  
25 to start putting in the new generation of EV charging

1 systems that are publicly accessible.

2           And it was pretty incredible when we added it all  
3 up and saw that over a hundred different locations  
4 throughout the nine-county area, and over 1,100 charging  
5 units within those hundred areas were being proposed.

6           So again, even though we didn't get that funded,  
7 it provides a starting point for where we will go back. All  
8 of us are now at the point of trying to think about is that  
9 really where we want to do it for the next round of funding?  
10 Is that what we will be asking for? Maybe yes, maybe no,  
11 maybe with some modifications, but it gives us a good  
12 starting point for moving ahead and with knowledge, now,  
13 somewhat more of what those policy issues are brings  
14 together a whole planning -- set of planning activities.

15           But one of the main things that I want to  
16 emphasize is that what we're doing through this corridor  
17 project isn't just the charging infrastructure. Obviously,  
18 it also includes something that we've talked about here this  
19 morning, the whole process for expediting the home charger  
20 installation process, making it a smooth, quick, painless  
21 process so that consumers don't get discouraged by lengthy  
22 delays.

23           That is something that we want to have happen not  
24 only city by city, or county by county, with their each  
25 individually coming up with ordinances, policies, programs,

1 but we want to do that as much as we can on a consistent  
2 basis throughout the Bay Area.

3           So that if you buy a car in San Jose, it's going  
4 to be a similar process to buying one and putting your  
5 infrastructure in place in Marin County. Make it so that  
6 people, because they aren't just going to buy in their  
7 community, necessarily, they will be moving around, but we  
8 want to make it something where we've streamlined the  
9 process from a governmental stand point, in terms of the  
10 permitting and the inspecting process.

11           We're putting together training programs for the  
12 building inspection people and keeping them up to date, even  
13 as they have turnover in personnel, of doing training for  
14 some of the installers and even people at the dealerships,  
15 so that we're all on the same wavelength of what type of  
16 package of information consumers need to get and how to make  
17 it an easy process for them.

18           Another area that we're focusing on is in the  
19 concept of the multi-family buildings, and I lump into that,  
20 at least for this purpose, workplace charging. Because in  
21 both cases we're dealing with property owners who have a  
22 different set of drivers.

23           Now, they're not buying a vehicle and need to get  
24 a charger in for themselves, they're thinking about or we  
25 want them to think about putting charging infrastructure in

1 for others.

2           So we're trying to come to grips with how we get  
3 programs going to motivate those property owners and work  
4 with them, and make it easy for them as well.

5           I mentioned a fleet before, and one of the great  
6 benefits of this Government-to-Government activity is that  
7 we have been getting the fleet managers together in a very  
8 focused way that they have never done before, of talking  
9 about specific types of vehicles.

10           They are comparing notes, finding out what  
11 vehicles are available. They're looking at ways where they  
12 can, if not do pooled orders, maybe they can do some sharing  
13 of demonstration vehicles, do tech training for their  
14 different fleet management people, where it's all consistent  
15 and they're working with the manufacturers.

16           But that's a very active communication area and  
17 one that I think is going to accelerate the way in which we  
18 get the vehicles into the fleets within this region.

19           A bunch of others, and I've put down here in one  
20 box just the new building wiring, we've talked about that  
21 today, that's something very much on the radar screen of  
22 getting ordinances in place consistently throughout the Bay  
23 Area, that will require new buildings to have, in their  
24 parking facilities, wiring that can make them EV ready.

25           Working with private fleets is another area where,

1 again, working with the Bay Area Climate Collaborative and  
2 the private sector partners will have a big impact.

3           Solar charging, we're working. Individual cities  
4 have looked at this, but we want to try and figure out how  
5 we can do this on a broader way throughout the Bay Area, of  
6 having solar or other renewable, probably solar, but could  
7 be any renewable systems tied in with charging facilities.

8           And obviously we're all now, this is a big  
9 learning curve for people, all of us, but certainly most  
10 local officials, the whole concept of integrating Smart  
11 Charging or Smart Grid, what is the city role, or local  
12 official role, what do we have -- what should we be doing  
13 about that?

14           And there are some areas, some jurisdictions  
15 within the Bay Area that have municipal utilities, and PG&E  
16 serves most of us, and we are talking to them and want to  
17 work with them as much as we can, be helpful with them. But  
18 we also have, within San Francisco, the San Francisco Public  
19 Utilities Commission that provides electricity to the City  
20 functions and all of our muni buses.

21           The City of Palo Alto and other cities have  
22 municipal, local municipal utilities.

23           So we are looking for ways that we can have all of  
24 our officials educated on what the needs, opportunities are  
25 for us to work in that area.

1           And just another area that I think is not often  
2 thought of, but this whole concept of workforce development,  
3 which includes everything from green collar jobs to very  
4 specific training programs, as I think Peter mentioned this  
5 morning, the grants that came out for the Workforce  
6 Development Program and here, in the Bay Area, we did get a  
7 several hundred thousand dollar grant that includes within  
8 that electric vehicle infrastructure workshops for going  
9 consistently through the counties for doing the training  
10 programs, to do the type of work highlighted in that box on  
11 the top row on expediting home charger installation.

12           So we've got to start at doing that proactively in  
13 the Bay Area, through the Workforce Development Program.

14           We've had at least two major stakeholder meetings,  
15 which I would now call the Public/Private Collaborative, and  
16 we've had three meetings of the Government-to-Government  
17 group. We're aiming to have quarterly meetings, at least,  
18 of the Government-to-Government group in a large sense, and  
19 probably more frequent or between the quarterly meetings,  
20 anyway, there will be subgroups working on the different  
21 types of boxes -- or issues that I had highlighted in the  
22 boxes on that previous side.

23           And so, finally, I just want to wrap up by saying  
24 that in terms of AB 118 and what we could do with the CEC,  
25 obviously, we're going to be coming back to you, Peter and

1 Tim, and all of you, with applications for specific  
2 projects, and help with infrastructure, and vehicle  
3 procurement.

4 But there's another aspect to it that I think is  
5 extremely valuable and can help leverage your dollars and  
6 leverage our efforts, and that is if you can just give us  
7 support on doing this type of regional coordination, perhaps  
8 by establishing some level of prioritization. You get extra  
9 points if you can show that you're doing some of this  
10 regional activity and coordination, for creating a regional  
11 market.

12 And perhaps there would be ways that we can  
13 actually apply for funding, to you, for supporting some of  
14 the technical and basically staff work for carrying out some  
15 of this regional funding.

16 But through the program and infrastructure  
17 development part of the AB 118 funding, I think it would be  
18 good if we could be creative to think how we could support  
19 some of the regional activity through that.

20 So thank you.

21 MS. BARODY: Thank you, Bob.

22 (Applause.)

23 MR. OLSON: So, Bob, I can't let you sit down  
24 without asking a question, first.

25 And I'd like to make one first comment. I've been

1 to a couple of your events and workshops and you have done  
2 exactly what you've said in your presentation, a very  
3 significant effort to get collaboration from lots of  
4 different parties, and it's really impressive what you've  
5 done so far.

6 MR. HAYDEN: Thank you.

7 MR. OLSON: I'd like to ask a couple questions  
8 about -- and I agree that we're thinking seriously about how  
9 to support regional -- if there's a group statewide that  
10 could do this, that would be great, but we think this is  
11 going to be more regional in nature when we're looking at  
12 setting aside money for this kind of activity.

13 And the more information you can provide to us on  
14 how -- this kind of refined information on where the  
15 customers are, when they're going to be customers, that type  
16 of thing would be really helpful to us.

17 And here's another thing that our Commissioners  
18 are looking at, to the extent, and whether you call it  
19 regional planning or regional collaboration, to the extent  
20 that you can help accelerate, not reducing any of the  
21 standards or the permit requirements, but make the permit  
22 process user-friendly, shorten the timeframes, accelerate  
23 that, that would be real valuable.

24 Given you've got a lot, you probably have the  
25 insights on how that process works with all of your members,

1 and there's got to be -- we think there's probably some ways  
2 of accelerating some of that effort.

3 MR. HAYDEN: Well, I think there are. It first  
4 begins by making sure that the national Electric Code -- not  
5 the national, but the application of the Electric Code,  
6 jurisdiction by jurisdiction, is up to date and fairly  
7 consistent throughout the region.

8 And it also involves having the permit officials  
9 just make sure they have a fast track process, to look at  
10 their systems and see if there is any fast track activity  
11 they can do.

12 A lot of the work, a lot of the delay I think, as  
13 I look at it, and it was some of the very interesting work  
14 that was done by -- presented by Nita Jaffe, of Clean Fuels  
15 Connection, in relating her decades of experience, or more  
16 than decades, at least, of experience.

17 It becomes evident to me that not all of the delay  
18 comes from the local jurisdiction side. A lot of the  
19 handoffs are between contractors, and dealers, and all of  
20 that, and when you add into that the permitting office and  
21 the inspector, it really gets to be quite laborious.

22 So we want to have a process in place where we  
23 start with the local government officials in the permitting  
24 and inspections offices, and then work with the car dealers,  
25 the infrastructure companies, and the installers to have

1 really a package deal in place for the consumers and try to  
2 put together a package of information.

3           So that if you buy a car in this area, you'll know  
4 exactly who to call, and what to expect, and how to get it  
5 done quickly.

6           MR. OLSON: Very good, thanks a lot.

7           MS. BAROODY: Thanks a lot, Bob, appreciate it.

8           Next up is David Worthington, of Sonoma County.

9           MR. WORTHINGTON: Good afternoon, my name's David  
10 Worthington, I'm the Assistant Fleet Manager for the County  
11 of Sonoma, it's about an hour north of where we're located  
12 right now.

13           Peter, Leslie, Tim, thank you for inviting me to  
14 give a perspective from a user, which would be our fleet,  
15 and what we are doing in Sonoma County, appreciate your  
16 time.

17           Just a brief overview of Sonoma County, we have  
18 over 482,000 residents, we have over 1,500 square miles of  
19 land mass, 2,557 miles of roads, and most of the land is  
20 used for agriculture in Sonoma County.

21           Our fleet composition, we have 1,500 vehicles,  
22 they include light-duty vehicles, as well as heavy-duty,  
23 off-road equipment, tractors, trailers, pretty much anything  
24 and everything that you can think that a private industry  
25 would use we have in our fleet.

1           Of that, 950 of those vehicles are automobiles and  
2 light-duty trucks, 550 are medium- and heavy-duty trucks,  
3 off-road equipment and the such.

4           Last year our fleet drove 10 million miles. That  
5 does not include the hours of our off-road equipment. Of  
6 that, the vehicles that did drive on the road, we averaged  
7 14.5 miles per gallon.

8           We've had a hybrid vehicle program in place since  
9 2002, when we first started purchasing Toyota Prius's.  
10 Since we've had that program in place, they've driven  
11 3,200,000 miles. We have saved 50,000 gallons of gasoline  
12 with that program and we've reduced our GHG emissions by 546  
13 tons.

14           This last fiscal year, 2008-2009, that same hybrid  
15 fleet drove one million miles, saved 16,000 gallons of  
16 gasoline, and reduced our GHG emissions by 181 tons.

17           We currently have a makeup of approximately 201  
18 hybrid and plug-in hybrid vehicles. Of that, the majority  
19 of them are Toyota products, but we're not Toyota exclusive,  
20 we have Honda Civics, we have Ford Escapes, and we recently  
21 purchased 14 Chevy Malibu hybrids.

22           We've had six of the Toyota Prius's converted to  
23 plug-in vehicles. We have two more that are scheduled  
24 within the next two weeks to be converted. We have seven of  
25 the Neighborhood Electric Vehicles that are produced by GM,

1 and we just took ownership of a Neighborhood Electric  
2 Vehicle truck made by ZAP.

3           What we are proposing in our next two years is to  
4 add 25 more Toyota Prius plug-ins that would be converted.  
5 We would like to add 50 electric vehicles, and five heavy-  
6 duty, either hybrid electric diesel trucks and/or plug-in  
7 hybrid electric/diesel trucks.

8           Some of the pictures here show you what we're  
9 talking about, the Toyota Prius's, as far as being converted  
10 to plug-ins. And then we have in the middle the Nissan  
11 Leaf, the new EV product that should be out in the market by  
12 the end of next year, and then a hybrid diesel bucket truck  
13 that we are awaiting delivery on right now.

14           Our current electric vehicle infrastructure, we've  
15 been working on it since October of last year when we took  
16 the delivery of our first plug-in hybrid Toyota Prius.

17           We have five level I charging stations in  
18 operation, they've been for the last couple months. Four of  
19 them are located on county-owned property in Santa Rosa,  
20 around our county center. We have one located at the  
21 Northern Sonoma County Air Pollution Control District. That  
22 is not publicly accessible. Four of those are accessible to  
23 the general public.

24           Four of the five are wired for 220 volts, for  
25 level II. When we went to install the infrastructure at

1 that time, we realized the importance of providing level I  
2 and level II wiring needs, so in the near future we could go  
3 strictly to a level II if the vehicles became available in a  
4 timely fashion.

5 So when we installed the infrastructure we ran the  
6 wires so we could have more charging stations installed in  
7 the same location, and/or run a combination station, which  
8 would be a level I and level II station.

9 Right now we're waiting for two more level II  
10 charging stations to get past landlord permission, because  
11 these are on leased properties. We are working with our  
12 real estate department with a lot of our landlords that we  
13 lease property from, and starting the conversation of would  
14 you be willing to allow us to install a charging station?

15 Due to the makeup of the County and the different  
16 departments, we do lease quite a bit of office space. As  
17 programs expand and we need more room, it's much more cost-  
18 effective and quick for us to react by leasing a building,  
19 than it is to purchase or build.

20 What we have done, what we would like to do, we've  
21 requested of \$150,000 through the Department of Energy Block  
22 Grants. If we're successful in achieving that funding  
23 level, we will add five more level I and level II charging  
24 stations, combination stations in our motor pool parking  
25 lot. These ones would not be accessible to the public, but

1 they would be used strictly for recharging our motor pool,  
2 which would be either plug-in hybrid vehicles or pure  
3 electric vehicles.

4 We would ask for six level I/II charging system  
5 combination systems accessible to the general public in  
6 highly visible locations around the County Center.

7 We have been placing our charging stations right  
8 now in a combination of the best visible station for the  
9 general public to be able to see what the County is doing,  
10 as well as based on what voltage is available within the  
11 buildings in our County Center.

12 We do have a number of buildings that are well  
13 over 60 years old, so we have run into challenges as far as  
14 infrastructure on the electrical panels, wiring, things like  
15 that.

16 We would make two more level I/level II charging  
17 stations accessible at our Sutter Medical Center and  
18 Hospital. We would also make two more accessible to the  
19 general public located in industrial parks near the airport,  
20 Charles M. Schultz Airport, in Sonoma County.

21 Sixteen of the 22 charging stations would be  
22 accessible to the general public. We believe it's critical  
23 that stations that are made available to the general public  
24 are in locations that they will physically use. It is of no  
25 use to have a charging station where people really aren't

1 going to go.

2           We're trying to work with private industry within  
3 the County to identify those companies that are willing to  
4 invest in the infrastructure, side-by-side with the County,  
5 to try to make a program within the County where there's  
6 enough charging stations to get from one end to the other  
7 without any problems whatsoever.

8           For 2011 and beyond, we were planning for a  
9 minimum of 80 level I and II combination charging stations  
10 by the end of 2010. Regionally, a minimum of an additional  
11 90 to 100 level I and level II combination stations to  
12 fulfill the needs of the local Sonoma County government, as  
13 well as those involved in the EV partnership, which includes  
14 the County, the Sonoma County Water Agency, and all nine  
15 cities located within Sonoma County.

16           Again, a majority of these charging stations would  
17 be accessible to the general public.

18           Capital costs. It's been our experience so far  
19 that the average cost of installation of a level I charging  
20 station, with pulling additional wiring to make it into a  
21 level II, is \$10,000 per station.

22           It's an approximate estimate because we've been  
23 very diligent in using our funds in a wise manner. We have  
24 used, supervised adult crews to do some of the  
25 infrastructure installation. We have tried to look at the

1 different areas within the County and separate them out to a  
2 station that would be installed very close to electrical  
3 outlets, to one that is 300, 400 feet away, to get an idea  
4 of what the costs are and how they vary from installation to  
5 installation.

6           The average cost of a level I and level II  
7 combination charging station is estimated between \$3,000 and  
8 \$4,000.

9           The units we currently have are the Coloumb units  
10 that Richard sells, been very happy with them. The pricing  
11 is different depending on if the unit has the cell phone  
12 module in it or not, because it's a daisy chain system of  
13 one being able to see the other, you only need one that has  
14 the cell phone module in it to link up and send the  
15 information.

16           The costs for level III were estimated at \$25,000  
17 per unit for installation costs. We're basing that on what  
18 we are currently paying to have infrastructure installed to  
19 meet the diesel regulations of on-road and off-road. We are  
20 doing diesel retrofit kits and some of those kits are plug-  
21 in styles, and require 220 volts, more than 30 amps.

22           So we've been looking at what our costs have been  
23 to install those stations, where they're located, and  
24 extrapolating that into level III costs.

25           The cost, obviously, is reduced if you're doing

1 multiple installations. If you're just doing one unit, it's  
2 fairly expensive, it's towards \$10,000. If you're doing  
3 two, you've already trenched, you've already run the lines,  
4 you're just running additional wiring, the incremental costs  
5 are much less.

6           The cost estimates are based on Sonoma County  
7 owning the property where the charging stations would be  
8 installed, and/or lease agreements with landlords that we  
9 have worked out, where they will allow us to install the  
10 systems on their property.

11           The regional cost estimate for doing 180 of these  
12 charging stations in the County on City-owned and County-  
13 owned property would be \$2 million. Right now it's fairly  
14 hard for us to estimate what it would be for a private  
15 industry to have the land put up and to pay for those  
16 charges.

17           We are trying to get, from our local EV group, a  
18 commitment from large companies within Sonoma County on how  
19 many charging stations they would be willing to place and  
20 trying to negotiate who would install them, who would  
21 maintain the data and all the other nuances of the charging  
22 stations.

23           What we need or what we're asking for in support  
24 for this to be successful in Sonoma County, as well as  
25 across California, and this is based on what we've seen so

1 far and what we believe needs to happen to make an EV  
2 rollout successful, right now at most we have a year and a  
3 half before we're going to have quite a number of EVs in the  
4 marketplace and without the infrastructure in place before  
5 they arrive, we could go back to the 1990s with the EV I and  
6 the results that came from the public not having access to  
7 infrastructure.

8 Right now the immediate thing we need is a SA  
9 agreed upon standard for the level II and III connectors.

10 We also need immediate funding made available to  
11 begin the infrastructure installation now. We don't have  
12 the luxury of waiting six months or eight months to start  
13 the installation of this infrastructure.

14 The permitting process, the looking at the  
15 buildings, assessing what voltage is available, where you  
16 can physically install it, ADA requirements, and everything  
17 else, the process can be lengthy and we need to begin  
18 installing infrastructure now to have it completed by the  
19 time the EVs roll out here at the end of 2010.

20 Funding for the conversion of hybrid electric  
21 vehicles to plug-in electric vehicles, we see this as an  
22 area where you can gain an immediate fuel consumption  
23 decrease, emissions decrease, and act as a bridge before the  
24 manufacturers introduce their own plug-in hybrid electric  
25 vehicles alongside their electric vehicles.

1           This is a technology that we've proven, it's  
2 immediate, we can get it done right away and start using  
3 those vehicles.

4           I drove down in one of our plug-in converted  
5 Prius's today. Last night I checked to see how much we  
6 charged it up with and it was 5.3 kilowatts. That cost our  
7 County 48 cents to recharge that battery, to gain a 20-mile-  
8 per-gallon fuel mileage difference.

9           And across our fleet of the plug-ins we're  
10 averaging a 20-mile-per-gallon fuel increase on the  
11 vehicles.

12           If the person that is driving the vehicle is a  
13 little bit more attentive, we can get even greater fuel  
14 mileage savings on the plug-in electric vehicles.

15           We are looking for funding for the differential  
16 costs between plug-in -- or between hybrid electric  
17 vehicles, standard vehicles, to go to all-electric vehicles  
18 or plug-in electric vehicles.

19           We've been very fortunate, my manager, Dave Head,  
20 has had a replacement program in place for a number of years  
21 that funds the replacement of vehicles between three and  
22 seven years, depending on what type of vehicle it is.

23           We're not looking for the full cost of any of this  
24 new technology, as much as the incremental cost of what we  
25 would have already been purchasing.

1           We also see an immediate need for the  
2 standardization of local and regional permit processing for  
3 the infrastructure.

4           Bob's spoken about it, a lot of people here have  
5 spoken about it, the permitting process, alone, needs to be  
6 streamlined for fleet operators as well as customers to be  
7 able to get the infrastructure installed right away so you  
8 have no buyer's remorse.

9           Regulatory changes, right now that is something  
10 that needs to be discussed, needs to come to a conclusion on  
11 what direction we would go with that as a State, because as  
12 a fleet we are looking at the amount of usage for each  
13 vehicle so we can track it and look at our overall costs.

14           We need to know how much we're paying for  
15 electricity and what we're getting in fuel mileage on these  
16 vehicles. In order to do that, you need the data. The  
17 data's great, but if you're being charged more than what you  
18 were physically using then it skews the results and it can,  
19 in some cases, make a plug-in electric vehicle or hybrid  
20 electric vehicle -- I'm sorry, a full electric vehicle look  
21 not as cost effective as it should be.

22           We've proven over the last seven years that a  
23 hybrid electric vehicle is cheaper to maintain than a  
24 conventional gas vehicle. From start to finish, we have had  
25 a lower lifecycle cost on hybrid electric vehicles than a

1 comparably sized gasoline vehicle, and that's been across  
2 the board for us.

3 In order to expand these cost savings, we need to  
4 know how much energy is being put into these vehicles and at  
5 what cost.

6 The abilities of users to charge at different  
7 manufacturer charging stations is also something that we see  
8 is a potential problem. We need a system in place that is  
9 similar to your cell phone in roaming charges. We need to  
10 have a customer that can get from the Bay Area using  
11 whatever charging system station happens to be available,  
12 come up to our County, use a completely different charging  
13 system station and not have to call different companies,  
14 have two different accounts, have two different bills sent  
15 to them. We need it more centralized so a customer only  
16 receives one bill at the end of the month, one statement.  
17 And it could be from various charging system companies that  
18 would be sending that information through to the company  
19 that they happen to have an account with.

20 We also are looking at training programs to  
21 educate our current technician workforce. This information  
22 is coming at our current workforce faster than they have the  
23 ability to keep up with it. Instructors and trainers are  
24 having a hard time keeping up with the technology.

25 I tell our techs all the time the changes they'll

1 see in the next five years will dwarf the changes they've  
2 seen in the transportation industry over the last 25 years.  
3 They will not recognize what this industry looks like in  
4 five years.

5           Because of the accelerated process that we're  
6 going through in this industry, we need to be able to keep  
7 up or at least try to keep up with training for the  
8 technicians.

9           Future of EVs in Sonoma County, we'd like to see  
10 200 plus charging stations in the County, that would allow  
11 the customer to go from one end of the County to the other  
12 without having any range or mileage anxiety. We'd also like  
13 to see that go beyond the County and come down into the  
14 local Bay Area.

15           We'd like to be able to have anybody from the Bay  
16 Area come to Sonoma County and know they can get there in an  
17 electric vehicle, as well as anybody in Sonoma County get to  
18 the other end of the Bay Area without a problem.

19           Thank you.

20           MS. BAROODY: Thank you.

21           (Applause.)

22           MS. BAROODY: Thank you, David.

23           Any questions for David?

24           MR. OLSON: David, I wonder if you could just  
25 clarify your proposal for 80 level I/II charging stations by

1 the end of 2010 and additional to a hundred. Is that for  
2 County purposes, mainly, or is that other -- does that  
3 include the potential demand from individual owners,  
4 corporate, other entities?

5 MR. WORTHINGTON: The 80 would be just for Sonoma  
6 County's fleet operations right now. We're basing the  
7 numbers based on how many electric vehicles we would have at  
8 that time, as well as plug-in vehicles.

9 The additional 180, up to 180, would include the  
10 other cities and government entities in the County.

11 On the private side, we haven't been able to nail  
12 down a good estimate of how many charging stations would be  
13 necessary. I think it depends a lot on the EV vehicles,  
14 when they come into existence, if they're going to be sold  
15 with the charging station or not.

16 It's been our estimate, which is rather high  
17 listening to the panel today, that we should have two  
18 charging stations available for every vehicle.

19 In our County, because of how it's spread out, the  
20 topography and everything, I think reasonably we need to  
21 figure on two charging stations per electric vehicle in our  
22 County.

23 MR. OLSON: Very good. One other question on --  
24 well, it's a comment, that if you're not aware of this, the  
25 Energy Commission, very shortly here, will be putting out a

1 solicitation rebate solicitation for the A123 conversion,  
2 Prius conversions. It's the one company that -- just like  
3 you use the same standard, you got to have CARB  
4 certification you got to pass, it's a rollover safety test,  
5 and one company has that -- meets that condition right now,  
6 at least for the near term.

7           And so we're going to provide -- we're going to  
8 provide, basically, the full incremental cost difference for  
9 those conversions.

10           MR. WORTHINGTON: That's great, that will go a  
11 long ways. There's a lot of other cities and county  
12 agencies in California that have actually been asking to buy  
13 our plug-in hybrids from us once we're done with them.  
14 We've been selling some of our hybrid vehicles to other  
15 counties and cities based solely on the information we've  
16 provided them on the fuel mileage savings. And that would  
17 go a long ways to saving fuel and getting more of the plug-  
18 in hybrids out into the marketplace.

19           MR. OLSON: And for the record let me, I want to  
20 correct myself in stating that A123 Prius conversions are  
21 not certified by CARB, they have a waiver for the  
22 certification process that's underway.

23           MR. WORTHINGTON: Yes.

24           MR. OLSON: In case someone from our sister agency  
25 is listening in.

1 (Laughter.)

2 MR. OLSON: Okay, thanks a lot.

3 MS. BARODY: Okay, any other questions, anybody?

4 Okay, thanks David, appreciate it.

5 Well, we're reconnecting our online audience,  
6 because the phone hung up on them.

7 (Technical difficulties.)

8 MS. BARODY: Yes, if the morning panel would like  
9 to find more comfortable seats, that would be great.

10 MS. BARODY: Okay, let's see. Oh, welcome to the  
11 afternoon panel, as you can see we're about an hour and a  
12 quarter behind schedule, so I'm sure we won't be leaving  
13 here at four o'clock.

14 Once they're set up there, we'll have Mark Duvall,  
15 of Electric Power Research Institute, speak.

16 Okay, are we ready to go?

17 MR. DUVALL: If I speak really loudly into the  
18 computer will they be able to hear?

19 MS. BARODY: Welcome, Mark.

20 MR. DUVALL: All right, thank you, Leslie. I  
21 tried to sell half of my speaking time to the other speakers  
22 for \$5 a minute, but they were worried about that being  
23 inappropriate. But I am going to try and just take a few  
24 minutes to talk about some things that EPRI's definitely  
25 studying at full speed on infrastructure.

1 I'd like to echo some of the urgency of the last  
2 couple of speakers, there's a lot that is knowable, but we  
3 don't know it yet and there's a lot of, I think, decisions  
4 out there to be made that are data driven, that we don't  
5 have the data for.

6 And all I can do is point a few of those out and  
7 hope that we get there as quickly as possible.

8 So, you know, I'm going to just say we had a lot  
9 of speakers in the morning, a lot of the infrastructure  
10 companies are brand-new to this field, there's a lot of  
11 energy. You know, it is really clear that we're seeing some  
12 major, major production plans unfold. This is all  
13 happening, I think that there's not much uncertainty about  
14 it, and we're still waiting to hear from some of the biggest  
15 players in this industry, like we still don't know what  
16 Toyota's going to do, we still don't know what Honda's going  
17 to do, those are two of the biggest hybrid manufacturers in  
18 terms of production.

19 So I mean we are hearing -- you know, there's just  
20 really a lot happening.

21 I don't think it is possible to understate that as  
22 much as it's happening, it's going to happen relatively  
23 slowly. I'm still waiting for permission from Southern  
24 California Edison to show you what I believe is the best  
25 current study on how many vehicles there could be over the

1 next five years. There's no problem, I didn't give them any  
2 notice so it's okay, Doug.

3 But, you know, in the end best case and achievable  
4 scenario is not more than a million and a half vehicles by  
5 2015, electric vehicles and plug-in hybrids. And probably  
6 the Administration's goal of a million vehicles is  
7 achievable, but extremely challenging, and that's if you  
8 assume that by 2015 means by, say, Christmas of 2015.

9 So that said, and that's important for the last  
10 slide, we just completed a major study on the carbon impact  
11 of electricity in California. Electricity's a very low  
12 carbon fuel, even if you look at what's on the margin, and  
13 it is important to note that we've been studying the  
14 environmental impact of electric transportation both  
15 nationwide and in defined regions, like California, for a  
16 long time.

17 And the single dominant factor of achieving the  
18 greenhouse gas reduction benefits of electricity is not how  
19 much public infrastructure is available, or how good the  
20 vehicles are, or how clean the grid is. The dominant factor  
21 is how many vehicles do you have?

22 So if you come at this from the automotive  
23 industry stand point, they need volume to make this work.  
24 More than anything they need volume.

25 The environmental assessment points very clearly

1 that the number of vehicles is the dominant factor driving  
2 the environmental benefits of electric transportation.

3           There's a social benefit as well, and that social  
4 benefit is also driven by the number of vehicles, as long as  
5 they're good vehicles. I mean, and I would define good very  
6 loosely as saying they displace a reasonable to significant  
7 amount of gasoline consumption with electricity and they  
8 drive the market forward, meaning if you buy an electric  
9 vehicle and your friends ride around in it, and none of them  
10 ever want to buy an electric vehicle, that doesn't meet my  
11 definition of a good vehicle.

12           But most of the vehicles that were made in the  
13 1990s did meet that definition. People rode in them, knew  
14 people that had one and also wanted one, so they drove  
15 market adoption.

16           Let's talk about peak impacts for a little bit,  
17 mostly because we'll have to deal with it at some point.

18           There are a lot of ways of looking at the power  
19 demand for charging prior to any sort of future scenario  
20 where there is Smart Charging, either because of aggressive  
21 action by third parties, or by utilities or others to get  
22 people on what I would call very good productive, off-peak  
23 charging behaviors.

24           And you can look at it two different ways, you can  
25 roll it up to the high level, what is the impact of

1 generation, it's relatively modest and always will be  
2 relatively modest.

3           Some of our work runs in at about maybe you're  
4 looking at a peak demand of 700 watts per vehicle, so for  
5 the first million vehicles in California you would be  
6 looking at 700 megawatts at more of a T&D level. Okay, not  
7 a big deal. But certainly, if you could avoid that 700-  
8 megawatt peak you would, and you can.

9           However, there's a lot of -- so even this  
10 assessment, which represents three to four months of work by  
11 some of EPRI's experts, is not the entire story.

12           Some of our colleagues correctly pointed out,  
13 well, why don't you look at cars that are -- why don't you  
14 look at cars that are newer than seven years old, because  
15 the newer cars are more likely to be in conventional commute  
16 patterns, they're most likely to arrive home during peak  
17 times, and things like that.

18           So we have to do more work in this area, as well.

19           But if you look at the local distribution impacts,  
20 they roll up very quickly to the house and what you can see  
21 is the distribution system is designed for the loads that it  
22 has to provide today, otherwise it would be inefficient. If  
23 you were throwing a lot of extra capacity into the system,  
24 rates would be higher than they are today.

25           So what you will see in general, and this is

1 especially true with pure electric vehicles, especially true  
2 since we have essentially agreed that we would move the  
3 level II charge standard from about 7 kw up to as much as 19  
4 kw.

5           So you can go into a residential level II charging  
6 scenario and draw 19 kilowatts. And Tesla has already built  
7 a vehicle that does towards that end.

8           Okay, if you go there, you'll have impacts right  
9 away. Now, what does that mean? Well, that means there's  
10 upgrade work to be done. The utilities have an obligation  
11 to serve and they can't let a neighborhood sit without power  
12 because someone bought a Tesla or bought another electric  
13 vehicle.

14           And so there will be upgrades. And you'll hear  
15 EPRI talk until the cows come home about Smart Charging,  
16 about fully integrating electric vehicles into the  
17 electricity system, using them as distributed storage and  
18 all these great things and, really, all of those things are  
19 designed around minimizing those upgrade costs. That  
20 preserves more of the social benefit of electric  
21 transportation and ensures the highest likelihood that the  
22 ratepayers are made whole or that there's minimal impact to  
23 rates.

24           And in some future, rosy scenario maybe we could  
25 even get to the point where these things are putting

1 downward pressure on rates, they are improving utility  
2 efficiency. And if you get to a scenario like that, it  
3 means you're doing so many right that you're also creating a  
4 dramatic reduction in fuel consumption, so your refinery  
5 capacity, imported petroleum dependency, all these things  
6 are down.

7           So that's a really good future world, if you can  
8 get there. But it starts, it starts by using the storage  
9 capability of plug-in vehicles in an intelligent system to  
10 create very good charging behaviors.

11           But always keeping in mind that those charging  
12 behaviors have to meet the needs of the users, we'll get  
13 nowhere by attempting to impose on drivers when they can  
14 charge.

15           And I've heard lots of scenarios out there, well,  
16 you can charge when there's surplus renewables, because then  
17 they would be zero emission, or you can charge at this time.

18           You have to draw two circles on a piece of paper,  
19 that one is the needs of the driver and one is what is  
20 optimum for the grid and you have to overlap them as much  
21 as -- you have to find out where that overlap is and you  
22 have to operate there.

23           I've shown these before so I won't go into it in  
24 detail. But there are significant grid impacts, especially  
25 at the feeder level or the local level. They're highly

1 manageable. If you can distribute the energy provided to  
2 the vehicles over a -- the nighttime charging domain, you  
3 can really manage the impacts.

4           This does save you locally. You know, this helps,  
5 but if you have a 25-kilowatt transformer serving five  
6 homes, and one of those homes adds an electric vehicle at  
7 five to ten kilowatts, it will create local stress and that  
8 stress will -- and that will have to be compensated for by  
9 the utility.

10           Okay, I'm going to -- I'm going to finish with the  
11 Charging Pyramid. And it's important to note a couple of  
12 things. First, I'd like to talk about standards, adoption  
13 of charging standards might be desirable but is,  
14 unfortunately, impossible.

15           Okay, the SAE Committee's responsible for this,  
16 having incorporated the input from multiple stakeholders in  
17 the auto utility supplier industry, government agencies, and  
18 they have arrived at a level I/II charge standard that is  
19 all but ready for validating and it's ready to go.

20           There is a small, but significant minority of  
21 those stakeholders that do not agree that that's the best  
22 standard. However, it is certainly good enough that  
23 electric vehicle adoption would never suffer for want of a  
24 better standard, so that standard needs to be put in place.

25           There was reference to a level III standard.

1 That's not actually correct, it's actually a DC charging  
2 standard. So the fast charging standard, and a lot of  
3 people call it the level III standard. Level III is  
4 technically still AC, whereas DC is actually -- the true  
5 fast charging is actually conversion of AC to DC, off-board  
6 the vehicle and then piped directly to the battery pack.

7 That standard is just beginning, okay, and I don't  
8 expect that by the time that some of the fast-charging  
9 projects that have been announced, like the eTec STDG&E  
10 demonstration, their last charger will probably be in the  
11 ground before that standard is finalized.

12 So it will not be possible in the near term to put  
13 in DC chargers and adhere to a standard. So we have to be  
14 careful that we understand what the retrofit or stranded  
15 asset implications of that might be, because any fast  
16 chargers that are going into the ground today are just going  
17 into the ground. And they will likely work in specialty  
18 situations. There's a couple of sets of intellectual  
19 property out there that are probably available for standards  
20 work but, you know, there's Aerovironment or AV has been  
21 putting in fast charging in industrial settings for a long  
22 time, they're very good at it. They have a set of  
23 connectors and a communication system that they like.

24 Tokyo Electric Power has done a demo in Tokyo and  
25 they've been active in California with their approach.

1 Probably either one of these would be the basis of a  
2 workable approach, but the point is that you can't create a  
3 standard by just pointing at that and saying we're just  
4 going to do that, that's a short-sighted -- that is a short-  
5 sighted approach, especially given the cost of these  
6 systems, probably close to \$1,000 per kilowatt to purchase,  
7 plus \$1,000 per kilowatt to install, very rough  
8 approximations.

9           It is especially not clear, with respect to DC  
10 charging, which auto companies will support it, will make  
11 product for it. The current demonstration that we're  
12 looking at, with SDG&E and some of the other things that  
13 will be announced, are very good ways to analyze how this  
14 works and to move on it when necessary.

15           We don't have enough debate, public debate about  
16 residential charging infrastructure. You have to understand  
17 where vehicles are and the majority of the vehicles is in  
18 this blue area, meaning they're parked at home. And when  
19 they're not parked at home, they're parked at work, which  
20 really points very directly to the efficacy of level I and  
21 level II charging as being a very efficient use of  
22 infrastructure dollars and pointing highly to privately-  
23 owned or company-owned infrastructure. Meaning I'm a  
24 homeowner and I own an EVSE and it's in my house, or I use  
25 120-volt charging.

1 I am a -- I own a company with a parking lot and I  
2 have either level I outlets or some level II EVSEs for my  
3 employees to use.

4 Here, in these cases, one of the nice things about  
5 this is you have entities that are paying for and own an  
6 infrastructure that are highly aware of what they need. A  
7 company is only going to put in what they need and they can  
8 respond to that, so they will make very efficient use of  
9 their investment.

10 We tend to gloss over recently, and it is -- it's  
11 natural, it's almost a euphoric time, there is so much  
12 happening, and it all seems to positive that we tend to  
13 gloss over the idea that if a fleet does something, or a  
14 private company does something and it turns out to be the  
15 wrong thing, they may turn their back on electric  
16 transportation and no come back.

17 We all have a lot of experience in this area and  
18 we want to avoid that. So knowing where the vehicles are  
19 and then placing infrastructure there is very important and  
20 that is almost overwhelmingly home and work.

21 And then, finally, the cheapest solution for range  
22 anxiety is a plug-in hybrid vehicle. It doesn't mean that  
23 electric vehicles aren't a good solution, they are a very  
24 good solution. But if we force one technology to meet all  
25 driver requirements, it's not only expensive, but it's high

1 risk.

2           And if it's high risk and it's expensive, it will  
3 minimize adoption, which will tend to slow the number of  
4 vehicles out there.

5           We look like we're getting a variety of solutions,  
6 a variety of different automotive technologies from  
7 different companies, and that's a very good thing. And some  
8 of them will not work and, hopefully, most of them will find  
9 a way to be successful.

10           And then, finally, we don't have enough data to  
11 intelligently plan infrastructure deployment.

12           There was recently a cost assessment model  
13 released on infrastructure planning for businesses and  
14 municipalities that is almost irresponsible in its  
15 prematureness. We don't have enough data to do this, we  
16 don't have enough data to make these investment decisions.

17           We're getting there slowly, but an intelligent  
18 deployment has to maximize the benefit of a given  
19 investment. And, you know, some of the proposals that are  
20 out there for electric super highways will not maximize the  
21 benefit of those investments over, say, a residential  
22 charging installation program, or a program to encourage  
23 landlords to provide charging for their tenants, things that  
24 are relatively low cost, may consist solely of outreach or  
25 education that do maximize those dollars.

1           And then, finally, I would say a variety of  
2 ownership business models will probably co-exist and are  
3 probably necessary to figure out what works in the end.

4           Okay, and that's what I have for today, thank you  
5 very much.

6           MS. BAROODY: Thank you.

7           (Appause.)

8           MS. BAROODY: Thank you, Mark. Any questions for  
9 Mark?

10          MR. OLSON: Yeah, Mark, I'd like to clarify the  
11 1.5 million -- you're saying the best case, 1.5 million  
12 vehicles, EVs, BEVs by 2010; is that a U.S.-wide number?

13          MR. DUVALL: Yeah, the study that I'm referring  
14 to, and we have a similar one in-house, looks at the first  
15 five years and makes what I think is a very good assumption,  
16 and I think most of the automobile industry would agree with  
17 you, that for the first five years you're supply  
18 constrained, your adoption is supply constrained, you can  
19 only have as many vehicles as get built.

20          And this is why manufacturing incentives, like the  
21 recent \$2 billion boost to the battery and electric drive  
22 industry are so important because you have to make vehicles.

23          And if you look at what is logical achievable by  
24 the likely players, based on what they've publicly said or  
25 committed to in a sort of a consistent pattern, not pie in

1 the sky, someone pops up, you know, at an EV conference  
2 cocktail and says his company's going to make a million  
3 vehicles per year, but what looks to be logical. And if you  
4 look at that, you can get to about a million and a half  
5 vehicles.

6 It's probably not likely unless a few things  
7 change that you can get for more than that, so I would call  
8 that an achievable scenario. And I would call a million  
9 challenging, but doable.

10 MR. OLSON: So what do you know about the demand?

11 MR. DUVALL: I personally believe, from experience  
12 and looking at this market, the price of fuel will have no  
13 effect on selling those million -- let's just call it a  
14 million vehicles. It will have -- I think it will have very  
15 little effective on it. I think a million vehicles  
16 nationwide is no problem.

17 You might even say a million vehicles in  
18 California in five years will be no problem. So I think  
19 demand's not an issue, I think people are ready and I think  
20 there's a tremendous amount of interest.

21 MR. OLSON: Is there more demand than supply?

22 MR. DUVALL: I think that will be that way for  
23 five years and I wouldn't be surprised if it was ten.

24 Remember that eight years was a million vehicles  
25 for hybrids, eight years, and we spent the first half of

1 that with two subcompacts. So the idea that we could do a  
2 million vehicles with plug-ins in less than eight years is  
3 really, really impossible.

4 I mean, we don't know a lot about price, just what  
5 people have said, but there's this feeling that these  
6 vehicles are going to come on the market at a price of about  
7 40,000 and carry a \$7,500 credit, looking at about 32 to 33  
8 thousand dollars.

9 What was the cost of the first Prius when it came  
10 out on the market?

11 MR. WARD: It was close to that.

12 MR. DUVALL: Twenty-eight. Yeah, so the 28 in  
13 1999 or \$2,000, so the price point is probably there.

14 For long-term mass production, no, but for that,  
15 you know, I think -- that's why I don't think it's that big  
16 a deal to dispose of that many -- that number of vehicles.

17 MR. WARD: Thank you, Mark, for your presentation.  
18 I think I noted that you might have left it ambiguous to  
19 Tim's question of whether or not it was California or the  
20 nation, but maybe that was on purpose.

21 MR. DUVALL: Oh, it was nationwide.

22 MR. WARD: Oh, okay.

23 MR. DUVALL: It was nationwide, I'm sorry.

24 MR. WARD: No, no, but then you followed up and  
25 said it could be a million in California, as well.

1           MR. DUVALL: I think if California had its own  
2 million vehicles, I think there's plenty of people in this  
3 room that would see that they get adopted.

4           But I just don't think it's -- I don't see how you  
5 would do that, I don't see how you would build that.

6           There's another point, not to be even more  
7 ambiguous, I mean I gave a presentation of how much data we  
8 need to get, and then I kind of throw sort of estimates out  
9 there like this.

10           But someone is looking into the capacity that has  
11 been funded, the battery capacity that has been funded  
12 through stimulus proposals, and they think that it's  
13 ultimately about 300,000 packs per year just from the  
14 stimulus funding. So there's some capacity going in, the  
15 future's uncertain.

16           MR. WARD: Uh-hum, and there may be some more  
17 coming from the battery manufacturing, hopefully. I'm  
18 hoping, anyway.

19           Great, thank you very much.

20           MR. OLSON: And, Mark, is there any -- do you have  
21 any insights about what might -- the rest of the world, what  
22 might happen, how that might impact the U.S., California, in  
23 terms of --

24           MR. DUVALL: Yeah, well, the rest of the world has  
25 disappointed me in the past. You know in Europe, there are

1 many countries in Europe that have much stronger financial  
2 drivers to adopt electric or hybrid vehicles and haven't  
3 done it, and diesel's not the only explanation.

4           And so one of the things is that people point to  
5 cost as a driver and they say cost, cost, cost, and I'm not  
6 sure that that's really the case, so it's a complex picture.

7           The U.S. was a big adopter of hybrid vehicles and  
8 now Japan is now a huge adopter of hybrid. Now, Japan was  
9 always there, but now they're -- you know, the Prius is  
10 selling like crazy in Japan and so it's hard to say.

11           You know, I was just in China, at the U.S./China  
12 EV forum that the DOE helped to put on, and they have this  
13 mass -- they're doing it the opposite of us, they're  
14 building from the bottom up, they're starting with electric  
15 bicycles.

16           And their key thought leaders think that they  
17 won't have any real highway capable technology, you know,  
18 full function technology available for at least five years,  
19 I mean that's kind of how their industry's maturing.

20           But it's possible to start a company and make  
21 money today making bikes, motorcycles with lithium ion  
22 batteries.

23           And, you know, we're going the opposite way, we're  
24 saying take the best car you can buy and let's make it a  
25 plug-in hybrid or an electric vehicle that everything that

1 it does, so we're starting from -- you know, really doing a  
2 top down approach.

3           It will be very interesting, but I think that it's  
4 very clear that it's a worldwide issue, and I don't know  
5 that that was necessarily the case in the nineties, when we  
6 had what was essentially a California-led EV push. It's not  
7 that there weren't vehicles in other countries, I just don't  
8 know that anyone chained themselves in front of a yard to  
9 stop them from being carted away.

10           MR. OLSON: Let me, going back to the U.S., your  
11 comment about the price of fuel will have no effect, meaning  
12 that when you look at the total cost stream, even if the  
13 electricity is cheaper than gas or diesel, on an equivalent  
14 basis, GGE basis, what would it take in terms of an  
15 incentive to kind of equalize that cost where fuel prices  
16 would have an effect?

17           MR. DUVALL: Yeah, a Chevrolet Volt at a long-term  
18 price, a car like a Chevrolet Volt, at \$32,000 can be life  
19 cycle cost competitive with a hybrid vehicle or a  
20 conventional vehicle at their likely cost separation.

21           However, there's not a lot of evidence saying that  
22 there is a huge group of people out there that see the world  
23 that way. EPRI just got a new member from Brazil and he  
24 came to our meeting for the first time and said that  
25 Brazilians tend actually to think that way off the bat, that

1 they'll pay more for a car that they can pay less on a  
2 weekly basis, and that's one of the things that makes  
3 natural gas popular over there, the cars cost more but you  
4 have to pay less per week.

5           So I guess you trade an up-front irritation with  
6 lower weekly irritation.

7           And so I think one of the issues back there is  
8 that in the first five years, when you're dealing primarily  
9 with early adopters, is the financial picture really pushing  
10 it?

11           I will say one thing though and that is that  
12 everything that EPRI's ever done in this area on cost  
13 analysis has been with the implication that people are  
14 getting their electricity at retail residential rates from  
15 their home charging.

16           So if you start to -- remember, if you start to  
17 add other ownership models, they add cost to that because  
18 they have equipment to get a return on, they have investment  
19 that they need to earn a return on, they have O&M costs that  
20 you simply don't really have at the residence, and it will  
21 increase the payback time.

22           So the charging model or the ownership model of  
23 the charger is, I think, very important to this discussion,  
24 and I think we need a better understanding of what people  
25 are actually going to pay at these multi-user, public access

1 charging networks.

2 I mean, I've done some back of the envelopes on  
3 fast charging that depend on your assumptions but they could  
4 be prohibitive, you know, it could be very expensive,  
5 gasoline equivalent pricing, depending on what you pay for  
6 the capital and what it costs to operate it. And if you're  
7 at 5:00 p.m., summer peak, you could pay some very high  
8 prices for electricity.

9 But once again it points to the idea does someone  
10 own an electric vehicle to save money or do they own it as a  
11 lifestyle choice, and the answer is probably yes to both of  
12 them, depending on the person.

13 MR. OLSON: And there are examples in natural gas,  
14 where this will be for fleet pricing, that contracts for  
15 fuel for natural gas vehicles are a big advantages, even  
16 with retail prices being a good comparison, the  
17 gasoline/diesel fleet pricing, meaning a year-long contract,  
18 is a way of even reducing that cost even more.

19 MR. DUVALL: And we agree completely.

20 MR. WARD: You mentioned the Volt at 32,000, that  
21 takes advantage of the Federal tax credit, is that what  
22 you're --

23 MR. DUVALL: I meant long term, so tax credit's  
24 gone away. You know, I think --

25 MR. WARD: Oh, prices come --

1           MR. DUVALL: Yeah, I think long term. And this is  
2 highly dependent on the price of fuel but there is ample  
3 evidence that lifecycle cost, the lifecycle cost potential  
4 of plug-in hybrids, or EREVs, or electric vehicles is  
5 substantial and there are a lot of cost models that need to  
6 be updated. We're generating a lot of new concepts and so  
7 we need to update a lot of the existing cost models.

8           But we typically always show, at EPRI, that --  
9 that, you know, conventional vehicles were -- hybrid  
10 vehicles were slightly more up front -- had higher up front  
11 costs than conventional vehicles, and plug-in hybrids were a  
12 little more, and plug-in hybrids with more range, like the  
13 Volt, were a little more and electric vehicles were the  
14 most.

15           But at \$3 and up, the steepness of the curves made  
16 most of the plug-ins a pretty good deal, net relative to  
17 hybrids or conventional vehicles.

18           And then what was often in question was the  
19 electric vehicle, because the battery was significant -- it  
20 was a significant expense that had, it was kind of a stiff  
21 expense that you had to deal with.

22           We're hearing a lot of people saying that may not  
23 be the case anymore, and while I'm not sure that I believe  
24 that, we do have to take a closer look at this. But it will  
25 all depend on, you know, what retail costs level out at, and

1 you won't know that for five years.

2 MR. WARD: Well, the lifecycle, you mentioned  
3 also, what about the battery life of that vehicle and you  
4 have to replace it sometime.

5 MR. DUVALL: I think battery life is going to fade  
6 as an issue. They're definitely very concerned about it  
7 now, which is why you're seeing relatively conservative  
8 approaches by the automakers to the design, and development,  
9 and management of battery systems onboard vehicles.

10 But for example, once again back to the Volt,  
11 sorry to make this sound like a GM commercial, but I am a  
12 part owner, as are all of us --

13 (Laughter.)

14 MR. WARD: You're here.

15 MR. DUVALL: Is that, you know, I think you could  
16 reasonably expect a Volt to last 4,000 cycles. I mean,  
17 based on what I know from publicly available testing that  
18 EPRI, and SC, and other utilities have done, 40 miles,  
19 160,000 miles, and they have more improvements to make. The  
20 industry's been very good at improving the durability of  
21 their product.

22 Price, and energy density, and things like that,  
23 we still don't have the really cheap, 300-mile EV, but we  
24 have very durable battery systems and I think there's every  
25 evidence that they're getting more durable.

1           And so while I think it will always be a concern,  
2 I expect that one to lessen in priority.

3           MR. WARD: I'm anticipating, from what the last  
4 go-round with batteries was, that was one of the bit  
5 sticking points of the debate, if you will, the life of the  
6 battery.

7           MR. DUVALL: Yeah, and I think it was very  
8 surprising when the accelerated test vehicles of Southern  
9 California Edison reached 100,000 miles and the batteries  
10 still worked. So I mean that was, I think at the end -- at  
11 the end of -- when we got done with electric vehicles,  
12 batteries were still expensive, we didn't have a 300-mile  
13 EV, but we had a hundred thousand mile EV, and that was  
14 something that no one really thought they could get.

15           In general, our perception of battery life about  
16 doubles every five or so years. And when I mean perception,  
17 it takes you three or four years to test a battery to that,  
18 to the types of life you're getting today.

19           And so the technology has been moving pretty  
20 rapidly toward greater durability and now we're starting to  
21 hear people say, wow, we think we can do 7,000 cycles.

22           So it's unproven at this point and a lot of data  
23 is cell level and not pack level, but I think that this is  
24 one place where the industry has overachieved relative to  
25 expectations, and if they continue to do so then this will

1 go -- this will go away and we'll be talking about secondary  
2 uses more.

3 MR. WARD: And the range may not be as big as big  
4 an issue as we once thought.

5 MR. DUVALL: I think cost will be the limiter on  
6 range. At the end of the day, as batteries go down in cost,  
7 I think auto companies will attempt to make money and so  
8 that means let's make a less expensive car and sell it to  
9 more people, and make money on it.

10 MR. OLSON: Mark, in your studies that you  
11 mentioned, EPRI studies, can you make those available for  
12 our docket, are those clients going to -- I can point you to  
13 them, they're all public. Everything I've pointed to you is  
14 publicly available at this point, but I'll make a note of  
15 that.

16 MR. OLSON: Thank you.

17 MS. BAROODY: Okay. Well, thank you very much,  
18 Mark, appreciate it.

19 Next up, from PG&E, Saul Zambrano.

20 MR. ZAMBRANO: Good afternoon. I see we're  
21 rolling a little late so I'll try to -- I'll try to make up  
22 some of it so we can get some people on the road back to  
23 Sacramento.

24 First of all, thank you to the CEC and the CPUC  
25 for this opportunity to present. We think this topic is

1 incredibly timely and it needs the full brunt of all of our  
2 collective efforts to address this transition, which we are  
3 looking -- we are eagerly looking forward to.

4           Some of these slides I'm just going to shoot  
5 through. There's a couple key message and some others that  
6 really deserve some extended time.

7           But one of the things is like how are we setting  
8 the table, what is the framework that we're looking at  
9 relative to the adoption of these vehicles for California?

10           And, you know, from everything we've heard  
11 relative to our talks to automobile manufacturers, 2010 is  
12 really the initial focus of mass marketing for a new  
13 generation of electric vehicles.

14           I think everyone has seen that, it's relative to a  
15 lot of the industry events that go around, that center  
16 around this topic. But what is clear -- there is a bit of  
17 ambiguity as to how many of these vehicles, when will they  
18 come to market, but what is pretty clear is that they  
19 provide significant environmental and economic benefits.

20           And it's -- and like everything in life, you got  
21 to manage the runway. And from our perspective, we think  
22 the runway is getting short relative to the launch of these  
23 vehicles.

24           And, you know, unlike one pilot per the plane,  
25 this is a really interesting dynamic because you actually

1 have four or five pilots in the cockpit trying to coordinate  
2 messages and communicate effectively to get this plane off  
3 the ground.

4 Right and, you know, when we look at who is  
5 critical to making this successful in the marketplace, we  
6 see the CPUC, the CEC, the utilities, the utility companies,  
7 the automobile manufacturers, the technology vendors, you  
8 know, and the stakeholders that go along with that crowd.

9 And what we decided, we said, you know, how are we  
10 going to manage the introduction of these vehicles as a  
11 utility and who is -- where is the most critical discussion  
12 that we need to have.

13 Well, clearly, from a regulatory perspective it's  
14 the CEC and the CPUC.

15 But it's also we are in deep discussions with the  
16 automobile OEMs relative to what are their expectations of  
17 the market. You know, what type of vehicles are they  
18 bringing to the market, you know, what time are they  
19 bringing these vehicles to the market and in what volume.

20 And then the next two slides, it's kind of a  
21 summary of our discussions. And the way to read this slide,  
22 there's two key messages here. You know, one of my favorite  
23 sayings is that every technology has its window and we truly  
24 believe that this is the window for electric vehicles, and  
25 the two principal drivers behind that is the return of \$3.00

1 a gallon gasoline. I'm sure everyone's filled their gas up  
2 within the last week or two, and we know what that is, it's  
3 around 3.20 a gallon right now.

4 And from our perspective it's, you know, you got  
5 to say will the supply and demand imbalances either get  
6 better and make gas more affordable or will they actually  
7 get worse and make gas, you know, less affordable.

8 And so from our perspective we look at what's  
9 happening in the global landscape because that's the right  
10 way to look at the petroleum industry

11 And you ask yourself, you know, Brazil is growing,  
12 Russian's growing, India is growing, China's growing, so the  
13 relative supply -- the relative demand is growing at a very  
14 healthy pace.

15 And then you got to ask yourself, well, what's the  
16 supply window look like? And we keep coming back to the  
17 reality that it's more expensive to pursue petroleum  
18 reserves. This is like in its -- you have to do it in  
19 politically stable areas, so there's a cost associated with  
20 that.

21 So, you know, from our perspective you have to  
22 take a -- you have to decide whether you believe peak oil is  
23 real or not, but from our perspective we actually, we truly  
24 believe it.

25 And I think the other key component of this slide

1 is that when you looked at what's happened in the past  
2 versus what's happening in the present day, over 70 percent  
3 of automakers are introducing plug-in vehicles. This is by  
4 market share, right.

5           And they're doing it with a variety of form  
6 factors, so they're targeting different types of consumer  
7 niches, right, or not consumer niches, but the different  
8 types of cars that consumers want, whether they're  
9 performance, family sedans, compacts, SUVs, and minivans,  
10 just to name a view.

11           And one of our observations around this is that  
12 it's different, a lot of automobile manufacturers coming to  
13 this space, they're bringing product, they're bringing  
14 product to address different consumer classes. What's  
15 very interesting is they're all targeting different  
16 attribution -- not attribution models, but different ways to  
17 harness telematics to differentiate their product. So it's  
18 like they're looking at these from a network perspective to  
19 actually be informative to the consumer relative to their  
20 entertainment consoles.

21           And each one of them has somewhat of a different  
22 play, but what we'll be clear is that a majority of these  
23 vehicles will be networked. They will be networked in a  
24 variety of different ways and they will differentiate  
25 themselves relative to the products that they offer their

1 customers, like to the type of services that they provide.

2           And I think the other key thing is that there were  
3 a couple of statements that were made earlier and the -- you  
4 know, one of the things that we're not seeing in North  
5 America at this particular time, there has been no publicly  
6 announced partnerships relative to battery swapping  
7 architectures.

8           So we're viewing that space pretty optimistically,  
9 we think it will happen, but we're still waiting to see  
10 whether those announcements come to fruition.

11           But the only reason I mention this is because this  
12 is not a knock against a particular business model, but I  
13 think relative to that type of architecture there's going to  
14 be grid impacts.

15           Right, so it's like whether it's a level III  
16 charging at high voltage, high load, there are going to be  
17 great impacts that need to be managed by the utilities. And  
18 it's whether it's a battery swapping station, we don't know  
19 what the grid impacts are because it will be highly  
20 dependent on what their inventory model is.

21           And so if they got three or four batteries that  
22 they've got to continuously be charging at a very high pace  
23 throughout the day, there will be great impacts.

24           And if they got an inventory stocking model of a  
25 hundred batteries, they could probably defer all that

1 charging to off-peak. All right, but that's one of the key  
2 areas that we're looking at, we're looking at pretty  
3 optimistically, but we know it's an area that we, as a  
4 utility, have to address proactively like in a very  
5 constructive manner so we know what that means to the  
6 overall grid.

7 Now, I think one of the questions that was asked  
8 earlier of Mark is how do you look at the demand for these  
9 vehicles?

10 And I know the chart is busy but if, you know, to  
11 channel Mark, if there's anyone who tells you what the  
12 volume projections for these vehicles are and they tell you  
13 with 95 percent certainty this is what's going to actually  
14 come to market, well then you're probably at a carnival.

15 No one knows. Right, no one knows. But there are  
16 ways to be intelligent about what you think the volume  
17 forecasts are and what we did was we said let's look at some  
18 of the studies that were commissioned by various -- various,  
19 you know, commissions -- not commissions, but various  
20 government entities within California and say, okay, how  
21 does that compare to the HEV historical adoption rate ten  
22 years pushed forward.

23 And I'm from the technology sector and what we've  
24 know is that if there's a technology, and it's a related  
25 technology, you know, but significantly different, the

1 diffusion curve tends to be a factor of 2X or 3X.

2           So when we looked at the HEV historical, and this  
3 is that black line right down there, second from the bottom,  
4 we said the past ten years relative to the next ten years,  
5 you know, how does that compare to some of the projections?

6           And as you can tell it's actually -- you know, the  
7 projections are material, right, it's like a lot of the work  
8 that's been done so far is actually a good gauge of what  
9 we're going to see relative to these vehicles, if everything  
10 that comes to pass the way that we think it is, you know,  
11 for the PG&E service territory, so this is the projection  
12 for PG&E service territory.

13           So the Tiex average of 300,000, you know, plug-in  
14 electric vehicles by 2018, and PG&E, could come to pass if  
15 everything aligns in a perfect world.

16           And what are the drivers? And when we look at  
17 this we say the drivers are, are Californians going to buy  
18 more than their fair share, which we have done for the HEV  
19 market. We've bought 24 percent of the EVs in North  
20 America, meanwhile our population is only 12 percent and so  
21 which is a demonstration of our commitment to values and to  
22 leadership.

23           And then it's what type of increase federal/state  
24 incentive mechanisms are going to be put on the table for  
25 these vehicles and what are the charging consumer behavioral

1 norms?

2           This goes back to Mark's statement relative to  
3 commodity instatement.

4           Like my perspective is that there's going to be  
5 two types of individuals for these cars, the people who want  
6 to make a statement relative to their values and then the  
7 people who do the back-of-the-envelope business case  
8 analysis to figure out is this good for me or not.

9           I happen to be the back-of-the-envelope -- I care  
10 about the environment, but it's got to pencil out for me;  
11 right, and it's like that's where we think the price of gas  
12 will make a difference. For the people who are looking for  
13 an economic equation that works for them either on a  
14 mathematical basis or is complementary to them relative to  
15 their value set.

16           And then the biggest game changer that we look at  
17 relative to these plausible game changers, it's the battery  
18 technology advancement. And what is interesting about this  
19 space is that there has been a ton of money invested in  
20 battery technology companies and the cost curves are coming  
21 down faster than anyone thought a year ago or two years ago,  
22 which fundamentally makes the economic equation much better  
23 for consumers as they purchase these vehicles.

24           Now, what are the opportunities and challenges for  
25 a utility for this, right? Now, there is going to be

1 increased loads due to PEV charging, which is yet to be  
2 quantified on the distribution system because we just don't  
3 know where they're going to go; right.

4 But based on where people have purchased HEVs, we  
5 expect them to be highly clustered, right. So this goes  
6 back to the overall it matters relative to the secondary --  
7 the secondary distribution system for the utilities. And  
8 it's like it's critical from our perspective to do load  
9 management.

10 You know, at the end of the day if you don't  
11 manage these vehicles and they cluster, it's like you will  
12 have transformers that blow, right, and relative to the  
13 utility charger of safety and reliability, that's  
14 unacceptable on our part.

15 So from our perspective, we're actively looking at  
16 how do we mitigate the adverse impacts to the distribution  
17 system?

18 So we're very fortunate in California in that  
19 California has already made their investments relative to  
20 the advance meter initiative, which is a -- it's a Smart  
21 Meter architecture.

22 So there is being -- we are currently deploying,  
23 as well as our other utility partners in the State of  
24 California, an advanced, you know, a Smart Meter  
25 architecture that effectively lays out the -- that creates a

1 bi-directional data communication plane, which we are  
2 looking at how do we manage Smart Charging relative to that  
3 architecture.

4           So it's like we call it the HAN platform, which is  
5 home area network, which is jargon, but it's basically how  
6 do we know what EVs are charging via, you know, EVSE  
7 charging stations and how do we support them relative to  
8 dynamic billing, it's load management opportunities, and  
9 standardization of utilizing our existing infrastructure.

10           And why do we right, that's the important  
11 question, why do we want to do that?

12           Well, one of the key, one of the key things we're  
13 looking at that if you don't do proper load management,  
14 you're going to get the spiky effect. It's people are going  
15 to come home, TOU rates are going to be put in place, they  
16 start at ten o'clock, everyone sets their timer to ten  
17 o'clock and all of the sudden you've got an artificial peak  
18 and you've got transformers popping, right.

19           Now, the question is, is like what does the  
20 charging profile of these vehicles look like and I'll touch  
21 on the charging profile with the balance of the slide, but I  
22 also want to go back to some of the standards work that's  
23 being done.

24           There's really four types of charging profiles  
25 that are in development today, the AC level one and the AC

1 level two, that is the 1772 charging profile that is being  
2 developed by SAE and its various partners. And, you know,  
3 that's effectively a 12 amp to 60 amp, as much as an 80-amp  
4 circuit.

5 Now, what does that mean? Well, that means that  
6 the charging profile is 1.4, 3.3, or 6.6 kilowatts.

7 Now, when we look at that lower left -- the lower  
8 chart on the bottom right-hand corner, how do those charging  
9 profiles compare to the average peak load for across the  
10 PG&E service territory. And as you can see, it's the 1.4,  
11 the 3.3 and the 6.6, that is the equivalency of a house, or  
12 half a house, of a quarter of a house.

13 So when we looked at this it's -- and this is all  
14 with the fundamental belief that these cars are going to  
15 cluster and we actually have analysis that supports that,  
16 that we're effectively going to have to -- in order to  
17 maintain the reliability and the safety associated with the  
18 utility charter, we're actually going to have to dynamically  
19 manage that, right. It's not going to be enough for us to  
20 just, you know, let these cars come on the grid and not  
21 mitigate the impacts that they could -- that they could pose  
22 to the grid.

23 Now, if I go to the lower left-hand corner, you  
24 now, what do we think will be the predominant charging  
25 profile?

1           And what we did on this lower left-hand corner, we  
2 said what is the charging time associated with these  
3 different charging profiles?

4           And we keep coming back to the conclusion that  
5 most customers are not going to be happy with the seven-hour  
6 charge time, right, and that's that 120-volt type charging  
7 profile, and it's like they're going to want 240-volt,  
8 whether it's 16-amp or 30-amp, to get that charging profile  
9 down to three hours and two hours.

10           You know, so that effectively means that that 3.3  
11 and that 6.6 charging profile we think is going to be the  
12 norm, not the exception. And that will represent either an  
13 incremental new house load or a whole house load.

14           So this chart I'm not going to spend a lot of time  
15 on. It's, you know, basically, we've been involved in this  
16 space for quite some time, not only on the electric vehicle  
17 side, but on the natural gas side as well.

18           We've partnered with CEC on many projects, we view  
19 them as a strong partner.

20           This is like to getting to the right answer, I'll  
21 let people read this on their own, but it's really just an  
22 example of a CARB-funded infrastructure program that we've  
23 done, how we funded it, what type of equipment providers we  
24 brought to the table and what we've accomplished.

25           The key takeaway though is that we made provisions

1 for future cord set and coupler upgrades to new SAE J1772  
2 standards.

3 I think what is critical here, is Mark hinted on  
4 this earlier, there are a lot of people who are coming to  
5 market, who are basically saying I have a solution, right,  
6 but a solution without a clear -- a clear alignment path,  
7 with a standards-driven architecture, so we don't get into  
8 this inductive versus conductive problem that we face in the  
9 first go around is critical because otherwise there is a  
10 strong risk of stranded infrastructure. All right, and it  
11 is clear that needs to be a goal set for any program  
12 relative to the alignment of a standards-driven deployment.

13 This is just pictures of what we did relative to  
14 our partners and some of the installation.

15 But the key lessons learned here was that SAE-  
16 compliant equipment, this is -- there's two principal  
17 standards that are being driven by the organization. The  
18 actual physical connectivity is 1772, that is effectively  
19 balloted so that should be done relatively soon, and  
20 relatively soon like in a month.

21 The EVSE communications from the charger to the  
22 utility is a standard that's being drive by SAE, it's called  
23 2847, we consider that a key standard so that we can enforce  
24 that bi-directional communication.

25 The architecture needs to be upgradeable, right,

1 so it's not enough that you deploy a solution that is  
2 stranded, it's like there has to be a clear line of  
3 upgradeability relative to future enhancements for the  
4 infrastructure.

5           It's engaged stakeholders early, there's a lot of  
6 stakeholders. And I think Richard and Coloumb really  
7 highlighted this point well in this morning's session, is  
8 educate local planning and permitting agencies.

9           When we keep looking at what does it take to  
10 install one of these chargers, it's we keep coming back to  
11 this is one of the principal choke points. It's every  
12 municipality has its own approach relative to installation,  
13 permitting, and so forth, right.

14           We strongly believe that there has to be some  
15 harmonization in order to get this -- in order for this to  
16 be cost effective.

17           The posting of charge rates on equipment, it's --  
18 I think that's self-explanatory but, you know, it's about  
19 setting customer expectations.

20           ABA issues still need to be fully addressed. I  
21 think people have scratched the iceberg but have not  
22 completely gotten to the bottom of all those issues.

23           The network effect, we think it's critical  
24 relative to these solutions that it's not only that the  
25 chargers, but people are made aware of the chargers using

1 utility -- not utility portals but basically, you know,  
2 consumer portals. Like where are these chargers, are they  
3 working, are they available?

4           And you can do that either through kind of what,  
5 and I always use this short term, WEB 2.0 architectures, but  
6 basically can you do it through your internet, whether it's  
7 your phone or your laptop.

8           And then siting agreements for new installations  
9 take time.

10           So with that being said, you know, as a utility we  
11 support the acceleration and standardization of vehicle  
12 charging infrastructure. It's got to be open, plug and  
13 play, national, convenient for consumers. I think there  
14 needs to be, as there was in natural gas, incentive to  
15 authorize needed investments in charging infrastructures,  
16 the expedited approval of new utility time variant tariffs  
17 and other load management measures, and streamline building  
18 permit and retrofit regulations, and then establish as  
19 policies safety and reliability standards, you know, that  
20 take it -- that is part of the utility mandate.

21           I think that's it. And I think the key thing is  
22 that we have an obligation to our customers, both EV and  
23 non-EV. We have an obligation to provide a level playing  
24 field for all auto OEMs and so we have to provide a solution  
25 that addresses the entire auto OEM community.

1           And it's -- and we need to do it so we don't  
2 stifle demand at the consumer level and that we actually  
3 foster innovation at the technology level, with people who  
4 want to participate I this area. Okay.

5           MS. BARODY: Thank you, Mr. Zambrano. Do you  
6 have any questions?

7           (Applause.)

8           MR. OLSON: Yeah, Saul, this is Tim Olson, I have  
9 a question about -- can you describe, does PG&E currently  
10 have any special program for renewable energy sources for  
11 transportation, for electric vehicle?

12           So if a customer wanted to have an entire  
13 renewable energy mix as a source of power through a contract  
14 or a program, could they get that? Is that anticipated?

15           MR. ZAMBRANO: Yes, they can. Actually, we still  
16 have two rates in effect, E9A and E9B, that effectively  
17 allows anybody who has an electric vehicle to have an EV-  
18 specific rate, and so they just have to call our operations  
19 center, or our call center, and we can service that request.

20           MR. OLSON: And do you have any comments about,  
21 we've had discussion here about having separate meters, this  
22 question about how to streamline or standardize the permit  
23 process?

24           One comment was don't have separate meters; any  
25 viewpoint from your company on that?

1           MR. ZAMBRANO: Yeah, we've actually been looking  
2 at this quite a bit and there's really -- there's three  
3 types of metering arrangements that you can look at.

4           One is a parallel meters, so you basically have  
5 two meters on the side of your house and you route the 240  
6 circuit to your garage.

7           The other one is subtractive metering, which  
8 effectively subtracts out the EV usage from your entire  
9 house.

10           And then the other one is to craft an EV-specific  
11 tariff that addresses your normal daytime usage, and then  
12 your EV message at night. And what's interesting about  
13 those three different approaches, they all have level --  
14 different levels of costs associated with them, and the cost  
15 is in different places.

16           If you look at the subtractive metering, the cost  
17 is primarily in the IT integration relative to the billing  
18 architectures of utilities. It's actually a very  
19 problematic programming challenge.

20           If you look at the parallel meter it's -- you have  
21 a lot of site visits, the provisioning's more expensive, and  
22 you have the added cost of the second meter as well as the  
23 EVSE.

24           If you look at how do you look at the whole house  
25 rate, that structure for EV owners, you can actually do it

1 in a very clever way so that it minimizes the number of  
2 visits relative to installation, and it's -- and it  
3 addresses both the needs of the consumer relative to off-  
4 peak charging.

5 MR. OLSON: Thank you.

6 MS. BAROODY: Okay, thanks a lot, Saul.

7 Okay, next we have, from Southern California  
8 Edison Company, Mr. Doug Kim.

9 MR. KIM: Thank you. Good afternoon and thank you  
10 for this opportunity to be on the panel today.

11 I'm pretty exciting to talk about some of the work  
12 that we are doing as a company on this PEV.

13 My name is Doug Kim, I am the Director of a  
14 relatively newly formed PEV readiness program for Southern  
15 California Edison. It's a multi-functional, it's an across-  
16 the-company effort to basically, with the objective of  
17 getting the company ready when the cars start rolling out,  
18 probably in about a year.

19 One of the benefits of going kind of late in the  
20 day is there's almost everything you want to talk about,  
21 somebody has already covered that to some form or the other,  
22 especially after EPRI and PG&E, I think.

23 I could probably do this in two minutes, but I  
24 will talk about a few additional things. Now, we're pretty  
25 excited about this as a company. We've been in this space

1 for quite some time. For over two decades now we've been  
2 continuously operating electric vehicle program.

3 We have the largest private fleet, electric fleet  
4 in the country, with over 17 million electric miles to date.  
5 We have extensively and collaboratively worked with many  
6 stakeholders, automakers, battery suppliers, and other folks  
7 in this space and, obviously, some of the folks have noticed  
8 our effort, we had a very nice visit with the President, I  
9 guess in March of this year.

10 Now, as we look ahead there are challenges and we  
11 are working seriously on how to address those challenges.  
12 The fact of the matter is that of the annual cars that are  
13 sold in the United States, about 12 percent I think is  
14 bought in California.

15 But when you look at the hybrid electric cars over  
16 the last ten years, eight years or so as a proxy, I think  
17 about 24 percent of that is purchased in California and  
18 about a half of that is in the Los Angeles County. So we  
19 know that in about a year there will be a number of these  
20 cars showing up in our service territory.

21 So the question then is how do we get ourselves  
22 ready between now and say in about a year, just addressing  
23 some of the customers' needs.

24 So rather than spending a lot of time talking  
25 about the analytics and the data that most of the folks have

1 already talked about, what I want to really focus about for  
2 the next five minutes or so is just what are we doing  
3 specifically to address those near-term needs.

4           You know, as a utility, we always look at, before  
5 we make a long-term investment decision, and we look at ten  
6 years or more down the road. And it just doesn't work very  
7 well in this case, right, we've all talked about, gee, you  
8 know, what is the market adoption rate in 2020? Well, we  
9 don't know, it gets pretty hazy.

10           We looked at a number of different data points.  
11 Somebody mentioned the supply side, based on what automakers  
12 say they will make, we looked at the -- we looked at the  
13 capital market analysts, what they think the market will do.  
14 We looked at independent consultants, other research  
15 institutions and the government agencies, and the fact of  
16 the matter is the numbers are hugely variable.

17           So basically we're operating under three  
18 principles which is let's not presuppose we know exactly  
19 what the market is going to look like in 2020, let's look at  
20 the market development in terms of phases, right.

21           So the three principles we're using is, one, let's  
22 figure out how we are going to address 2010 and 2011 market  
23 between now and sometime the middle of next year, right,  
24 there are a number of things we're going to do and we're  
25 going to talk about that a little bit later.

1           The second thing is how do we maximize the  
2 customer choice? Because in our view one of the things  
3 that's going to matter critically in the adoption rate of  
4 this plug-in electric vehicle is the customer satisfaction,  
5 the easiness that they can navigate through all this  
6 installation process, and the different grid options. So  
7 we're really focusing on the second principle.

8           And the third option is, the third principle is as  
9 we go through this OIR process this year and going onto next  
10 year, there's going to be a lot of discussions about the  
11 policies and things like that, and we've responded to a  
12 number of those things in the 42 questions that we got.

13           Our basic mode of operation in there is let's make  
14 the right decisions at the right time and let's not make all  
15 the decisions or try to make a lot of decisions today.

16           So this is the organization that we have within  
17 Southern California Edison, it's roughly five -- there are  
18 five pieces. There's the regulatory, the whole management  
19 around the stuff that's going on in OIR and other regulatory  
20 policies, there's a team that's focusing on that.

21           There's a business case development team. Someone  
22 mentioned earlier, well, what are the numbers, what are the  
23 cost impacts for taking other different types of options, so  
24 we're evaluating a lot of different scenarios and also  
25 looking at what does that cost, what are the benefits for

1 making those choices, so we are continuing to work on that  
2 as well.

3           A third piece, which I think is really important  
4 it addresses to the near market, which is the customer -- an  
5 operational plan that addresses customer process. So we  
6 have a team that basically looks at all the process from end  
7 to end, right, not just what happens when somebody calls up  
8 the phone center? But it's really a more holistic approach,  
9 from the initial moment the customer engages us to actually  
10 they can start driving their car, we're looking at the whole  
11 process, so that's that team's effort.

12           Customer communication and marketing strategy, we  
13 think that's a critical piece. The fact of the matter is  
14 this market doesn't really even exist today, it's beginning.

15           A lot of folks who's going to be purchasing these  
16 cars will not be very familiar with lots of different  
17 details about how to go about getting the stuff installed,  
18 and what type of rates that they should be on, and so forth.

19           So we are developing right now a plan to address  
20 some of that.

21           And the last piece is our infrastructure upgrade  
22 plan. You know, many folks have addressed the need to look  
23 at sort of very localized distribution level, see what  
24 happens when folks buy, say, a car that charges at level II,  
25 which goes up to 19 point per kilowatt, that's somebody

1 mentioned it's like adding a house. Yeah, what happens if  
2 there's two or three of them in the neighborhood, which is  
3 entirely possible in the places like, say, Santa Monica, so  
4 we're looking at that as well.

5           So it's really all of these different pieces that  
6 make up the effort for this team.

7           So guiding principles, a lot of discussions but,  
8 from our view, the number one thing that we can do is  
9 support our customers, right. We talked about processes,  
10 we've seen this year, through a Mini E experience, it could  
11 take weeks sometimes to get through this process.

12           Because for one, even if we get all our process  
13 highly optimized, there are a lot of folks involved in this  
14 thing; there are the cities, all right, that you have to get  
15 permits, you have to get inspections, so by the time you add  
16 all of that process up, you know, it can add up to weeks.

17           So we're looking to figure out how to minimize  
18 that.

19           Customer choice, obviously, you know, there are  
20 different rate options that are available right now. You  
21 know, customers could choose to stay on their current tiered  
22 rate, or they could choose to go on a whole house TOU rate,  
23 which has a PE component to it -- PEV component to it.

24           Or they can go onto a dedicated, which requires a  
25 separate meter to measure their usages.

1           So we have all those different options available  
2 to day and basically our position is while we like folks to,  
3 you know, perhaps choose the options that will save some of  
4 the process times, right, because if you put dual meter  
5 you're putting additional time.

6           Somebody mentioned that earlier, we've seen that  
7 happen this year as well, when you put a dual meter it just  
8 adds more complexity. But we will make all those choices  
9 available to all the folks who choose that rate.

10          Customer education, this is an important piece.  
11 Really, there's two pieces here. Not only outreach and  
12 educating the customer but in our view one way that you can  
13 really reduce the process time is while people are actually  
14 thinking about buying a car, right, don't buy a car and then  
15 bring it home, and then figure out how to get I charged

16          While you're thinking about buying a car, we'd  
17 like to be able to somehow reach out to those customers have  
18 them raise their hands and work with them concurrently so  
19 that we can reduce substantial amount of this cycle time.

20          So that's a plan that we're currently developing  
21 and hopefully, within the next few months, I think we'll be  
22 able to start, you know, implementing some of these  
23 campaigns, and we certainly hope to do that before the cars  
24 start coming out next year.

25          Getting the infrastructure ready, all of the

1 complications, implications, people have talked about that  
2 already.

3           We are currently building and running some  
4 simulation models about different effects, you know, in the  
5 local circuits. And as we get through a little farther  
6 we'll have a deeper understanding of physical impact and  
7 therefore potentially cost impact. And so that's a work  
8 that's ongoing, but it's clearly an important issue for the  
9 utilities because level I, level II, and level III charging  
10 just has a tremendous, especially if you go up to level II  
11 and three, a tremendous impact to the utility.

12           Okay, this is the OIR process that's ongoing and  
13 we certainly are prepared to fully engage and support the  
14 Commission in developing fair and workable policies.

15           Three principles, basically compliance with the  
16 existing policies because after all, you know, we have to  
17 make sure that our total electric system, reliability's not  
18 jeopardized through this process and that there are  
19 reasonable and appropriate rates for customers that purchase  
20 electric vehicle.

21           And we also want to optimize system use, right,  
22 and we definitely encourage folks through rates and other  
23 incentives to charge during the off-peak hours because that  
24 will really help us.

25           Encourage and support all the adoption. Again,

1 this is all about addressing customer needs, our strong  
2 focus that we have today.

3           And adopting codes and standards, this is  
4 critical, right, because there are lot of possibilities of  
5 these electric vehicles. You know, I hear talks about  
6 vehicle to grid, which is a definitely possibility down the  
7 road, I hear a lot about, you know, load control or other  
8 types of programs. All of that is depending on these  
9 vehicles and EVSEs to be compatible with our Smart Grid, so  
10 we strongly encourage the Commission to ensure that the  
11 whole State adopts those standards.

12           The interim focus, again, we talked about focusing  
13 the right issues at the right time. The fact that there are  
14 42 questions in the OIR, I think that's a good indicator of  
15 how complex these issues are.

16           And from our view, you know, we have 14 million  
17 people in 50,000 square miles, there's not going to be one  
18 single solution that fits all of these needs, it's going to  
19 be some type of a hybrid solution. And we are very open to  
20 engaging the OIR process, and the Commission, and other  
21 stakeholders to come to the right conclusion.

22           So that's what we're looking forward to in the  
23 near term.

24           In terms of AB 188, a specific recommendation, I  
25 think somebody mentioned earlier this morning, in our

1 service territory there are 1,800 charge points that could  
2 probably be refurbished with a relatively minor investment,  
3 so I would strongly encourage that we take a look at that  
4 possibility for Southern California.

5 And after that, again, then we'll have to engage  
6 in the process to figure out what happens in the next phase  
7 with the build-out plan.

8 So that summarizes what we as a company, we're  
9 doing right now.

10 MS. BAROODY: Thank you, Mr. Kim.

11 (Applause.)

12 MS. BAROODY: Questions?

13 MR. OLSON: So, Doug, in response to your focus on  
14 now approach, the Energy Commission, in our April 2009  
15 Investment Plan estimated a need for upgrading existing, all  
16 existing charge points in the State and to set aside money  
17 for some new.

18 We heard here today that maybe the planning should  
19 be one and a half to two charging stations per vehicle.

20 And from our interviews with automakers, we're  
21 estimating of anywhere in 2010, if you add it up, close to  
22 5,500 vehicles that might be on the road, part of that  
23 rollout.

24 So in essence we're thinking we're setting aside  
25 enough money. We have already funded some of the eTec

1 projects that will be installed, and then we're setting  
2 aside money, we think, to cover this kind of near term.

3           So I guess the question is what more -- in  
4 essence, this workshop is about kind of planning for July  
5 2010 on. How many more stations, these charging points  
6 should we plan for and how far in advance? So is this year  
7 by year or do we need to plan two or three years from now in  
8 terms of allocating money and spending money on that  
9 infrastructure; any insights on that or comments?

10           MR. KIM: Yeah, that's obviously a tough question  
11 because that presupposes that you know the adoption rate  
12 over the years and where they're going to happen, right,  
13 it's just not -- it's not sufficient that you know how many  
14 cars because you kind of need to know where they're going to  
15 show up, right, because then you can focus on those areas.

16           What we are doing as a company, we're looking at  
17 2010 and 2011 as a planning period. So the plan that we're  
18 doing is not year by year, per se, but it's initially the  
19 first couple years, and then the next cycle of planning,  
20 which will be next year, will cover 2012 through 2014, so  
21 that will be the next three-year cycle.

22           So our hope is that as we get a little smarter  
23 about how the market is developing in the 2010 and certainly  
24 all or part of 2011, we'll be able to make a lot more  
25 intelligent choices about where to focus on in terms of,

1 say, grid infrastructure upgrade, in what areas. So that's  
2 kind of where we are heading.

3 Our view is, and this is just a near term, 2010  
4 and 2011, when you consider the number of cars and the  
5 likely adoption areas, I think it will be highly localized  
6 and it will be mostly home charging.

7 So we feel that if we can combine that with, say,  
8 some of the existing charging infrastructure, that may be a  
9 reasonable to get us kind of through the hard spots.

10 MR. OLSON: So in our plan what should we -- is  
11 there an estimated time frame that we should consider as the  
12 installation time to be ahead of the rollout?

13 MR. KIM: Certainly, the 2010, the fourth quarter,  
14 we think will be a relatively small number of cars. And  
15 2011, certainly we can, I think in our service area, expect  
16 to see fairly significant cars, so that perhaps that's the  
17 one to --

18 MR. OLSON: Okay, thanks a lot.

19 MR. WARD: Doug, I have a question, too.

20 MR. KIM: Yes.

21 MR. WARD: You probably are no doubt in touch with  
22 all of the vehicle manufacturers and getting an early  
23 warning on when those cars and when they'll eventually be  
24 rolled out. And I know that you can't know where they will  
25 all go, but I know that the automakers do have hand-raisers

1 show up in particular areas and regions for other fuels, and  
2 this one probably as well.

3 MR. KIM: Yeah.

4 MR. WARD: Are you getting any early intelligence  
5 for regions, zones, areas within your service territory?

6 MR. KIM: Yeah, there's a couple ways. Three ways  
7 of really we're kind of going about doing this. One is yes,  
8 definitely, you know, as you know, we talk very  
9 collaboratively with the automakers and some folks do have  
10 perspective.

11 But second data point though is that when we look  
12 at the early adoption of, let's say, the hybrid cars, back  
13 in the early 2000 through 2002 or '03, it gives us a pretty  
14 good proxy for the kind of neighborhoods they would expect  
15 to see, they would expect to see these cars show up.

16 And the third part is obviously just directly  
17 engaging customers. Remember that I talked about customer  
18 outreach program. One thing we'd like to get out of that  
19 program is not only simply telling customers and educating  
20 them as what they need to do, but please tell us, right,  
21 whether you're interested in buying cars, so that we'll have  
22 advanced intelligence as to where to focus. So we're really  
23 using all three.

24 But we have some idea right now of where the areas  
25 are.

1 MR. WARD: Thank you. Your customers probably  
2 have a better insight as to where that market would be,  
3 rather than the automakers, they may be responding to their  
4 customers, too.

5 MR. KIM: Right, right.

6 MR. WARD: So staying in touch with your customers  
7 is probably a good thing.

8 MR. KIM: We really here are trying to get as much  
9 information from the customers.

10 MR. WARD: All right, thanks very much.

11 MS. BAROODY: Thank you very much.

12 Well, we're getting toward the end here, we have  
13 two more speakers. And the next is San Diego Gas and  
14 Electric Company, Jeffrey Reed.

15 MR. REED: So let me be, I think, the second to  
16 the last to thank the CEC for convening the workshop and the  
17 CPUC for hosting it.

18 So I'll be pretty brief here, give a few  
19 perspectives regarding the AB 118 program.

20 And let me just start by saying that like the PIER  
21 companies, SDG&E has already started on the PEV readiness  
22 road.

23 We're fortunate to be one of the host locations  
24 for the eTec study that you heard about. In addition, we've  
25 been awarded a Smart Grid demonstration project in the

1 region of a small scale, and have applied for another, much  
2 larger program under the stimulus program, and we think that  
3 in the San Diego region those two things, together, will put  
4 us pretty well along the road to PEV readiness and should  
5 hopefully provide a knowledge base that a lot of people  
6 throughout the State can use.

7           So let me begin by just giving a little context.  
8 And I think, you know, this has been said by most of the  
9 participants here in various different ways. I think that  
10 the first point is that the goals of what we're trying to do  
11 are fairly straight forward. Obviously, they've taken a  
12 pretty long time to develop.

13           But the first goal would be to advance PEV  
14 technology in support of low-carbon fuel standard goals as  
15 an overarching goal, and then to ensure that the  
16 infrastructure is ready such that lack of infrastructure  
17 doesn't constrain the market, but at the same time being  
18 cautious about stranded investment.

19           Maximizing consumer convenience, while encouraging  
20 behaviors that are consistent with broader energy policies  
21 and effective and efficient use of the grid.

22           And then listed last, but first priority of the  
23 utilities, of course, is to protect the safety and  
24 reliability of the electric system as our primary goal.

25           So while these goals are straight forward, the

1 planning environment is not so straight forward, and I think  
2 that's been woven throughout all the discussions today.

3           A couple of underpinnings for this, the first is  
4 that the automotive industry, and the electric power  
5 industry, and their suppliers will move on their own paths,  
6 so there's a lot of communication, I think everybody's in  
7 contact and discussion with OEMs, but the drivers are  
8 slightly different across the two industries, so that's one  
9 point of uncertainty in the planning.

10           Next, consumer adoption and consumer behavior are  
11 uncertain. Any time we're in this pre-adoption stage of a  
12 market, you know, there's a lot of prediction that goes on,  
13 but no certainty.

14           Lastly, the underlying technologies in the PEV and  
15 the EV space are emerging and as well as that of competing  
16 technology. So when you look at PEV adoption and you look  
17 at, you know, bio-fuels that are being developed, liquid  
18 fuels, natural gas and others, so that adds to the already  
19 significant uncertainty of adoption for electric vehicles.

20           So I think we'd suggest a few principles, one  
21 would be to focus first on no-regrets priorities, meaning  
22 those things that we have to do anyways, so don't place big  
23 bets on major infrastructure build out and things like that,  
24 but focus on things like Smart Charging, Smart Grid  
25 integration, consumer behavior, and those types of things

1 that under whatever PEV scenarios may unfold those things  
2 are going to be needed and useful.

3           The next is focus on getting real consumer data  
4 wherever it can be found, and currently we can get that  
5 perhaps from earlier stages of the market.

6           The period of the mid-nineties has been mentioned  
7 quite a lot, but also places like Tokyo have been mentioned,  
8 analogous adoptions, and things like that.

9           But as well prepare very carefully now for the  
10 wave that we've been talking about, beginning in 2010 and  
11 the next few years, to be ready to carefully track and  
12 gather data in the first wave of market adoption, to begin  
13 to build the fact base that Mark was talking about.

14           Obviously, we need to be scenario based, so we  
15 need to be planning in terms of not one set of outcomes, but  
16 in light of the significant range of uncertainties across  
17 the different areas of market development here, and in that  
18 context I think we should look at pilots and experiments of  
19 various types as stranded investment. Obviously, we don't  
20 want to throw money away, but if we put out, say, 50 charge  
21 points, level III to see what consumers will -- how  
22 consumers will behave based on those, and how that impacts  
23 range anxiety, and things like that.

24           Even if some retrofit is required, it's probably  
25 money well spent as long as we carefully design those

1 experiments and don't foolishly create obsolescence where we  
2 can avoid it.

3           So just as some illustration, you know, one point  
4 of uncertainty is what's the head-to-head cost difference  
5 between the different low emission vehicle options that  
6 people have.

7           This is an Energy Information Administration curve  
8 showing the relative cost of different fuels. This  
9 particular curb is not adjusted for vehicle fuel efficiency  
10 or equivalent miles per gallon.

11           But you can see, you know, according to this  
12 project many fuels are kind of in a bunch there.  
13 Electricity, if adjusted for efficiency, mile per gallon  
14 equivalent of course would show, according to this  
15 projection to be a cheaper alternative, so I think the PEV  
16 adoption will be driven by that.

17           You also see natural gas has a fuel-to-fuel  
18 advantage relative to others.

19           Another kind of unknown not shown on this curve  
20 would be bio-petroleum type things that are forecast by some  
21 people to come into the market within ten years, and hit  
22 maybe.

23           So that would be also sort of a wildcard. So  
24 again, that just means that I think we need to plan for a  
25 significant, but uncertain level of PEV adoption beginning

1 in the 2010 time frame.

2 In addition to the, you know, fuel-to-fuel or  
3 technology-to-technology, there are a lot of different model  
4 options being developed, so I think the idea is let those  
5 things evolve and be ready to learn from them in the early  
6 stages of the market development.

7 In terms of utility role, I think this is fairly  
8 basic, it's been said by a lot of people, but the utility  
9 role predominantly would be to provide the necessary  
10 infrastructure to support market growth, to participate in  
11 the development, and the tools, and knowledge base on  
12 systems impacts and integration with the Smart Grid.

13 And also critical is the development of rates and  
14 programs to support policy goals, consumer education and  
15 outreach. And utilities, of course, are a natural partner  
16 in many of the pilots and demonstrations in this field.

17 So in terms of recommendations specific to 118,  
18 one would be place priority on modeling of some of these  
19 impacts, the modeling of clusters, electric system impacts,  
20 and these things, those will be needed regardless of the  
21 macro market formation,.

22 Because I think, as everybody said, clusters will  
23 certainly occur.

24 Smart Charging, interaction with Smart Grid and  
25 potential role of PEVs as distributed energy resources would

1 be another area of focus.

2 Behavioral studies and pilots, I'm thinking any  
3 analysis that's discussed, the uncertainty and the  
4 dependency on how consumers will behave is mentioned as very  
5 critical.

6 Things like the impact of public charging  
7 availability on range anxiety and impact of rates. You  
8 know, sometimes we kind of speculate how price sensitive  
9 will customers be, will marginal pricing alone be enough to  
10 keep people incented to charge off-peak.

11 Those types of questions are amenable to do at  
12 least partial answering through studies.

13 It's been mentioned a few times, possibly use some  
14 of this funding to complete the build out of some fast  
15 charging corridors without making any projections of how  
16 important fast charging or away-from-home charging would be,  
17 certainly allowing people to have the capability to travel  
18 between metropolitan areas with some certainty of being able  
19 to charge would be prudent.

20 And then development of market development  
21 scenarios, so funding studies to help build the proper  
22 scenarios upon which we can plan and help identify the  
23 critical planning uncertainties that have the highest impact  
24 and help us plan around those.

25 Thank you.

1 MS. BAROODY: Thank you.

2 (Applause.)

3 MS. BAROODY: Any questions?

4 MR. OLSON: Yeah. Jeff, we have a couple of  
5 questions now. I haven't read your comments. I'm kind of  
6 wondering how -- your comments touched on it, how  
7 (inaudible) -- to install in that area, the San Diego area,  
8 do you envision a role (inaudible) -- do you see yourself as  
9 a facilitator (inaudible) --

10 MR. REED: (Inaudible.)

11 MR. OLSON: Okay, thanks.

12 MS. BAROODY: Thanks a lot, Jeffrey.

13 (Applause.)

14 Great. Bill Boyce are you ready to go?

15 MR. BOYCE: Thank you. Let's go ahead and get  
16 this show on the road. So leadership, SMUD's been actively  
17 doing electric vehicle charging infrastructure for 18, 19  
18 years. So given our long history with this, it goes all the  
19 way from just being just a local infrastructure provider on  
20 regards to this type of R&D work, all the way to being  
21 across the whole State of California and Arizona. We're  
22 still active in the infrastructure, upgrading and taking  
23 care of the infrastructure in our area, the numbers are all  
24 there. We still work very closely with the electric vehicle  
25 community in our area, so we strive to meet the customer

1 needs and help the community as much as we can.

2           This data is in response to one of the questions  
3 you asked, it's the circa 2002 data, when we were at the  
4 height of our infrastructure installation. It really does  
5 give you a break down of the different installation charges.  
6 You can see what the effective hardware cost was, what the  
7 conductive charger, the conductive chargers at the time were  
8 about a thousand dollars less on any given average.

9           Primarily, you see a cost difference of about  
10 50/50, half of it being on residential, half of it being the  
11 installation price.

12           Level two, at the commercial installation, you see  
13 the difference there being higher, that's typically because  
14 you had to install a larger electric backbone and that was  
15 with regards to something on average about a three to four  
16 type EBSC installation for moderate coverage.

17           I think this was talked about, we did see that  
18 most of the charging was home-based. I think people are  
19 referencing the recent Pike data, 80 percent home-based.

20           Significant workplace charging, what we see in  
21 Sacramento, really, is what's called public charging in a  
22 lot of the downtown parking garages. Even though it's in a  
23 public garage, it's actually workplace for the State  
24 employees to work next to a building. The number one  
25 location, I think quite a few people in this room know about

1 Callie's PA parking garage at 10<sup>th</sup> and I.

2           But Tim, for one of your questions earlier, two  
3 chargers per, you know, car, when you take a look at 80  
4 percent of the charging is at home, I get to very much like  
5 1.2 chargers per car considering that 80 percent of the  
6 charging's at home. On average I would say that another 15  
7 percent is at the workplace and just, anecdotally, about  
8 another five percent actual public.

9           What you do run into though, you run into a lot of  
10 cities, and municipalities, and other groups that are  
11 wanting to lead, they want a full environmental stewardship  
12 and the desire to have public infrastructure out there is  
13 very high and that's why a significant amount of buzz keeps  
14 grappling with that issue.

15           The whole business model, I've had this in other  
16 presentations, really worked for a business case. We really  
17 did not have enough business volume, that a lot of money  
18 was -- I won't say a lot of money, but most of the money was  
19 made on the hardware sale, so you see a lot of companies  
20 that want to promote hardware. I think you see that still  
21 right now.

22           Installation activities, most of the contractors  
23 broke even, but maintenance and repairs lost money. Richard  
24 Lowenthal alluded to this today, our data from that period  
25 showed the average service call was \$255 each and many times

1 you showed up and somebody had either tripped a breaker or  
2 didn't know how to plug in the car right or had to reset the  
3 charger. But still, \$255 was out. Energy sales to recover  
4 that was on the order of 14 years.

5 So there certainly needs to be a new business case  
6 and very hard to overcome that with regards to what we had  
7 in the past.

8 The tough issues have been talked about quite a  
9 bit today, multi-family dwellings. One of the other things,  
10 on residential street parking, I don't think has been talked  
11 about, that how are you going to control internal combustion  
12 engine vehicles from using those parking spots. You know  
13 how many times I've tried to park in San Francisco, or  
14 downtown Sacramento and, you know, parking is a premium and  
15 are you going to control actual people, with an internal  
16 combustion engine car, from parking in those spots will be  
17 very difficult.

18 The other thing that we talked about, obviously,  
19 is Smart Grid, but none of the communication integration  
20 technology was really tackled. I think, actually, there  
21 were some concepts clear back in 2002 for this type of stuff  
22 that we see today, but just glad to see it's starting to  
23 actually come to reality.

24 So the complex issue, talked about home-based at a  
25 fixed level. A lot of this stuff is going to be at the

1 decision that depends on the customer. I think some of the  
2 interesting data right now that's coming out is from the  
3 textbook people, that show that even with a large battery  
4 pack how many people are still charging with level I?

5           The Tesla data I think's out there in the public,  
6 but I enlist you to go look at that, that significant people  
7 are charging level one. Most of the public forums, also the  
8 people with electric bikes and scooters have voiced their,  
9 you know, need for level I charging. So I think that's  
10 going to come down to the customer demand there.

11           Workplace charging, from our opinion, really needs  
12 to be level II. That way, for normal commute patterns,  
13 people that get to work in the morning will be done charging  
14 at noon. That's, you know, peak energy usage. Whether or  
15 not an employee will have that benefit will be probably the  
16 employer that will probably evolve that into some sort of  
17 benefit package.

18           And public, and I call it non-fixed parking, for  
19 things like street parking, big question, obviously. And,  
20 you know, this is one of these areas that I think Mark  
21 Duvall kind of alluded to, it's one of the unknowns that we  
22 don't know about. There's not a lot of data here, how much  
23 level I versus level II for the bikes and scooters? You  
24 know, whether level II, level III, DC fast charging, parts  
25 of me say level II charging on average is four hours.

1           If you ever got DC or level III charging to 15  
2 minutes, then you could say, hey, one fast charger displaces  
3 16 level II chargers.

4           How does that work into some sort of model of  
5 centralized versus distributed? And now as everybody's  
6 trying to do is now trying to make a buck with it all.

7           What we're doing currently, on April the 28<sup>th</sup>, we  
8 are on three automaker teams right now, primarily we'll be  
9 upgrading the public infrastructure in Sacramento to the new  
10 standard. Some of those recommendations, doing that  
11 statewide, you'll see on the next chart.

12           We'll also be supporting many new installations  
13 with our regional demonstration partners, which will be a  
14 more sweet application.

15           We will be installing the DC level III quasi fast  
16 charging refitting our hydrogen station, so we'll be having  
17 essentially a research fast charging, solar fed on the SMUD  
18 campus.

19           We are going to initiate a multi-family charging  
20 cost estimation study that we hope will change into a cost  
21 destination model, where we can go into apartment complexes  
22 in our service territory and more or less get some basic  
23 costs that we can feed back for people to figure out how to  
24 electrify at a certain penetration level.

25           And then everybody's been talking about

1 permitting. One of the things we did in the Sacramento area  
2 with solar is we went to all the municipal governments in  
3 the SMUD service territory and basically got all those  
4 municipal governments to accept an expedited permitting and  
5 we will be doing the same for electric vehicles.

6           Lastly, as all of the people here initiating Smart  
7 Grid AMI integration approaches, we've selected Silver  
8 Spring Network at the end of the year, last year, for our  
9 AMI contractor and kind of building upon a lot of that work  
10 is where we'll be heading with AMI.

11           So funding recommendations, update the old  
12 existing State infrastructure, I think you've seen that a  
13 couple times. It's a real low-hanging fruit and it really  
14 does put some infrastructure out there that can really help  
15 the anxiety for range.

16           One of the things that we did a lot of work,  
17 feedback though, is you've got to coordinate that with the  
18 Legacy drivers. It can't just be done wholesale, you need  
19 to work with the Legacy community. We actually take a look  
20 at what it takes with regards to, you know, with and without  
21 small paddle inductor chargers to make sure that the diehard  
22 supporters through all the years continue to be supported.

23           We also really believe a task force should really  
24 be brought to bear to come to grips with a lot of the public  
25 infrastructure. I know being more of a municipal utility, I

1 already have some of the city governments in our area coming  
2 out and saying what should they do. And the guidelines out  
3 there are really nonexistent. There's been no, I'll say,  
4 real, real analytic brainpower, it's all been analytical.  
5 But the types of stuff I think about are some of the same  
6 business models that site for gas stations. So what's the  
7 population density, what's the transit through-put criteria,  
8 what's the expected need versus, you know, where the  
9 chargers could be.

10           You know, some of the other types of things with  
11 regards to what the penetration rates are.

12           And then lastly, I've really been passionate about  
13 statewide building codes. You know, this was something I  
14 thought that should have been able to be done with Title 24,  
15 but I'm told it's not part of the responsibility of the  
16 Energy Commission.

17           I challenge the State government to form a task  
18 force to work, you know, across the board to make these  
19 types of things happen.

20           Lastly, workforce development, automotive  
21 technicians, the EV installation contractors. Anecdotally,  
22 in the preparation of our proposals we've had people come up  
23 to us and say, gee, what your experienced contractor can  
24 estimate in one week, I've tried to have a guy estimate and  
25 it's taken him four months. So a lot of the infrastructure

1 installation contractor workforce development really is  
2 going to have to be built up from the ground level. I know  
3 quite a bit of the stuff CSCI did in the southland, quite a  
4 bit of stuff we did in the northland. There's not a lot  
5 remaining, but that needs to be worked pretty soon as well.

6           So final thoughts, what we've done already, when  
7 you talk to other states, they're just barely getting  
8 started. Considering that we have 3,000 EVSE installations  
9 already in the State, just updating those right away is  
10 huge.

11           I was talking to folks from Portland and Portland  
12 General Electric, they're putting their first 30 charging  
13 stations out there. So what's kind of blasé in California,  
14 we could really, really go a long way for the first initial  
15 support.

16           Task force for those tough issues, those are issue  
17 we all fumble with. I think we need a coordinated approach  
18 to try to get to a lot of the issues that are -- I think the  
19 reason that it's tough is it's going to make -- you know,  
20 some of the decisions that we made in the past are going to  
21 be stranded out there, I'll come out and say it. But as  
22 some of the communication systems come in, some of the  
23 business models come in, what we have to charge for public  
24 charging, some of those legacy systems might have to be  
25 changed or swapped out, but at least in the beginning you'd

1 have good incentive for drivers that would help the market  
2 in California.

3 Technology will change and materialize, you know,  
4 nothing happens overnight. And as the technology, the  
5 business models in particular come into maturity things are  
6 going to change and flexibility is going to be needed to  
7 support all the way going forward.

8 So trying to make it quick, there it is.

9 MS. BAROODY: Thank you, Bill.

10 (Applause.)

11 (Due to technical difficulties, the last  
12 ten minutes of the hearing were not  
13 transcribed.)

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