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BEFORE THE  
CALIFORNIA ENERGY COMMISSION

In the Matter of: ) Docket No. 17-IEPR-07  
)  
2017 Integrated Energy Policy ) Integrated Resource  
Report (2017 IEPR) ) Planning

IEPR Commissioner Workshop on  
*Integrated Resource Plans*  
*Light Duty Vehicle Sector*

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

TUESDAY, APRIL 18, 2017  
10:01 A.M.

Reported by:  
Peter Petty

## APPEARANCES

### **California Energy Commission**

#### Commissioners Present

Robert B. Weisenmiller, Chair, Lead Commissioner  
Janea A. Scott, Commissioner, Transportation

#### CEC Staff Present

Heather Raitt, CEC, IEPR Program Manager  
Noel Crisostomo  
Tim Olson  
Michael Sokol, CEC

### **CPUC**

#### Commissioners Present

Carla Peterman

#### Staff Present

Amy Mesrobian

### **Presenters**

Tom Ashley, Greenlots  
Alberto Ayala, CARB  
Bill Boyce, SMUD  
Jonathan Changus, NCPA  
Bryan Cope, SCPPA  
Steven Douglas, Alliance of Automobile Manufacturers  
Shrayas Jatkar, Coalition for Clean Air  
Derek Jones, Navigant  
Kapil Kulkarni, Burbank Water & Power  
Barry Moline, CMUA  
David Packard, ChargePoint  
Katherine Stainken, Plug-In America  
Nancy Sutley, LADWP  
Geof Syphers, Sonoma Clean Power  
Beau Whiteman, Tesla  
Laura Wisland, Union of Concerned Scientists  
Alejandro Zamorano, Bloomberg

### **Public Comment**

1. Steve Taber, eMotorWerks
2. Samveg Saxena, Lawrence Berkeley National Laboratory
3. McKinley Addy, ADTRA

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P R O C E E D I N G S

APRIL 18, 2017 10:01 a.m.

MS. RAITT: Welcome to the workshop on Publicly Owned Utility Integrated Resource Plans, Transportation, Electrification, the Light Duty Vehicle Sector. I'm Heather Raitt. I'm the Program Manager for the IEPR. I'll quickly go over housekeeping items.

If there's an emergency and we need to evacuate the building, please follow the Staff to Roosevelt Park, which is diagonal to the building. Today's Workshop is being broadcast through our WebEx Conferencing System and parties should be aware that you're being recorded.

We'll post an audio recording on the Energy Commission's website in a few days and a written transcript in about a month. We're very fortunate to have a number of speakers today, and I'd like to thank you all for making time to be here.

And since we do have a very full Agenda we will be providing reminders about timing, hoping not to be too disruptive, but we'll let you have a two-minute warning and let you know when time's up. There will be an opportunity for public comments at the end of the day.

1           And you could fill out a blue card if you'd  
2 like to make public comments, and we'll also be  
3 taking comments from WebEx at the end of the day. So  
4 you can use the tap function to tell our coordinator  
5 that you'd like to make comments.

6           Meeting materials are all at the table and  
7 posted on our website. Written comments are due, and  
8 because of tight timing of everything, they're due a  
9 little earlier than normal, on April 28th, and the  
10 notice provides information on how to submit  
11 comments.

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

14           CHAIRMAN WEISENMILLER: Good morning. I'd  
15 like to welcome everyone here. Like to thank  
16 Commissioner Peterman for coming back home.

17           COMMISSIONER PETERMAN: Thank you.

18           CHAIRMAN WEISENMILLER: And basically, I  
19 think we've all made the point that it's really all  
20 about greenhouse gas emissions, and when you think  
21 about California's greenhouse gas emissions you have  
22 to think transportation.

23           And certainly, it's not only greenhouse gas  
24 emissions, but certainly, air quality. If you look  
25 at the South Coast and San Joaquin, transportation's

1 a huge part of the issues there. I mean, certainly,  
2 the recent studies on asthma rates for people who  
3 live within 500 feet of the freeways are pretty  
4 scary.

5 And at the same time, it's also about jobs.  
6 You know, 20 to 30 percent, though we'll get more as  
7 we get into the heavy duty next time, but certainly,  
8 20 to 30 percent of the economy in Southern  
9 California is goods movement.

10 So these are very important topics as we try  
11 to really electrify our transportation sector, and  
12 it's very hard. I mean, we have about, you know, in  
13 terms of looking at California, you know, we're 40  
14 percent of the applicable electric vehicles in the  
15 U.S., but it's still just a teeny fraction of our  
16 vehicles in California. So anyway, looking forward  
17 to today's conversation.

18 COMMISSIONER SCOTT: Well, good morning,  
19 everyone. Let me start by welcoming y'all to the  
20 Energy Commission today to discuss the Transportation  
21 Electrification Section of the Publicly Owned  
22 Utilities Integrated Resource Plans.

23 And I'd like to say a special welcome to  
24 Commissioner Peterman. Thanks for much for joining  
25 us here today. We're glad to have you. The purpose

1 of today's Workshop is to bring together a diverse  
2 set of stakeholder perspectives on electrification of  
3 the transportation sector to help inform what type of  
4 quantitative and qualitative information may be  
5 useful for inclusion in the Integrated Resource  
6 Plans.

7           Just to recap, Senate Bill 350 requires that  
8 the POU's adopt Integrated Resource Plans by January  
9 1st of 2019, and asked the Energy Commission to  
10 review those plans to insure consistency with  
11 provisions of the law, including that IRPs must  
12 address procurement of Transportation  
13 Electrification.

14           The language addressing procurement of  
15 Transportation Electrification provides flexibility  
16 in terms of how the IRPs discuss this emerging  
17 market, and the Energy Commission would like to work  
18 with the publicly owned utilities and other  
19 stakeholders to identify what data and information  
20 should be included in this section.

21           To start the discussion we have put forward  
22 a set of ideas for Draft Guidance, but it's our hope  
23 that today's discussion provides the Energy  
24 Commission and our POU colleagues feedback on how  
25 best to frame this section of the IRPs.



1           Our goal is to ultimately provide guidance  
2 that incorporates aspects of today's dialogue,  
3 reflects the diversity of the state's publicly owned  
4 utilities, coordinates with existing POU reporting  
5 requirements, and to the extent possible, encourages  
6 consistency across utility plans.

7           I want to emphasize that our intent is for  
8 today's Workshop to be the beginning of a  
9 collaborative partnership, or a continuation, really,  
10 of the collaborative partnership that we have with  
11 California's POU's.

12           So for in order, as the Chair just  
13 mentioned, in order for us to meet the state's  
14 greenhouse gas goals, cleaning up our transportation  
15 sector is a critical component. So coordination and  
16 collaboration between the state, local governments  
17 and utilities is imperative in order to plan for a  
18 robust charging infrastructure that can support  
19 increased penetrations of zero emission vehicles.

20           Transportation Electrification provides both  
21 a challenge and an opportunity for California's  
22 publicly owned utilities, and we look forward to  
23 working with y'all and the stakeholders to help push  
24 this market forward. So thanks, everyone, for being  
25 here today. I'm very much looking forward to our

1 discussions.

2 COMMISSIONER PETERMAN: Good morning,  
3 everyone. Thank you, Commissioner Scott and Chair  
4 Weisenmiller for including the Public Utilities  
5 Commission in today's Workshop. This is a critically  
6 important Workshop, as Chair Weisenmiller has noted.

7 Electrifying the transportation sector will  
8 be key for meeting our greenhouse gas initiatives.  
9 And I've appreciated the Energy Commission's  
10 leadership in zero emission vehicles over the years  
11 with the R&D programs, implementation of AB 8.

12 And the PUC appreciates having that  
13 knowledge, the knowledge about the technologies and  
14 where vehicles are going to inform our work in this  
15 area. As you noted, the statute has responsibilities  
16 for the Energy Commission and the Public Utilities  
17 Commission in overseeing the implementation of the  
18 transportation portions of SB 350.

19 And I'm proud to say that this is an area  
20 where we collaborate extremely well. The agencies  
21 have met over the years to talk about how to  
22 coordinate our investments and we're doing the same  
23 here.

24 And finally, I'll just pick up on a word  
25 that Commissioner Scott said regarding having

1 stakeholders here to inform us. What's so exciting  
2 about this space is that this is first in its kind  
3 what we're trying to do here. And so your comments  
4 truly matter.

5 We are figuring this out in real time. Both  
6 of us have a very active stakeholder process and we  
7 take your comments to heart. So be thoughtful about  
8 what you write. We might actually do it. And we're  
9 looking forward to working with you in the days to  
10 come. Thank you.

11 MS. RAITT: Thank you. So we first have a  
12 series of presentations to provide Policy Context and  
13 Overview of the SB 350 IRP requirements, starting  
14 with Michael Sokol from the Energy Commission.

15 MR. SOKOL: All right. Good morning. I'm  
16 Mike Sokol with the Energy Commission. I'm Special  
17 Coordinator for implementation of SB 350, and today  
18 I'm just going to provide a brief overview of the  
19 Guidelines for publicly owned utility Integrated  
20 Resource Plans.

21 So SB 350 gives the Energy Commission some  
22 responsibilities to -- in relation to the publicly  
23 owned utility Integrated Resource Plans, and here's  
24 just a brief list here that summarizes what those  
25 responsibilities are.

1           Essentially, we are tasked with reviewing  
2 the IRPs once they have been developed and adopted by  
3 the POU governing boards, and also plan updates,  
4 which essentially will be a full Integrated Resource  
5 Plan.

6           We are required to provide recommendations  
7 to correct any deficiencies in regards to the  
8 requirements of SB 350, and we are also working to  
9 develop with the hopes of adopting guidelines to  
10 govern the submission of information needed to  
11 support the Energy Commission's review of those IRPs.

12           So this just is a snapshot. I think  
13 everyone's familiar at this point, but these are the  
14 POUs that meet the threshold of having to file IRPs  
15 with the Energy Commission. And you'll notice here  
16 that there's 16 on this list.

17           It's possible that that list will change  
18 over time for the future updates as things evolve,  
19 but just to get a snapshot of the number that we're  
20 looking at. So this really gets into more of the  
21 meat of the presentation, which is, you know, what  
22 are the requirements of the POU IRPs, and this is  
23 from SB 350.

24           So first and foremost, to meet the  
25 greenhouse gas emission reduction targets for 2030

1 that will be established by ARB in the Joint Agency  
2 Process with the Energy Commission and the Public  
3 Utilities Commission, and we actually had a workshop  
4 yesterday to discuss the POU's specific targets and  
5 potential methodologies for getting to those.

6           Looking at IRPs, they are required to  
7 procure at least 50 percent renewables by 2030 for  
8 the Renewables Portfolio Standard Program, required  
9 to insure reasonable rates and to minimize ratepayer  
10 impact, and we're certainly cognizant that that's a  
11 big factor for POUs as you think through what these  
12 procurement plans look like.

13           Also, looking at insuring that system and  
14 local reliability are maintained. So I think for EV  
15 chargers that's going to be a big factor of, you  
16 know, where they're located, how many, what kind  
17 we're looking at.

18           Looking at enhancing distribution systems  
19 and demand side energy management, and really, a big  
20 one for today's discussing is minimizing local air  
21 pollutants with a priority on disadvantaged  
22 communities.

23           So in addition to the requirements of what  
24 the IRPs must address, or must meet, these are the  
25 requirements for what must be addressed in the POU

1 IRPs. And so that includes energy efficiency, demand  
2 response, energy storage, Transportation  
3 Electrification, a diverse portfolio and  
4 consideration for the resource adequacy piece.

5 And I think today's discussion will cover a  
6 little bit more of what the Energy Commission Staff  
7 is envisioning it means to address Transportation  
8 Electrification. And so you know, Commissioner has  
9 stated, but we're really looking for feedback and  
10 input from stakeholders here.

11 So this is just high level, sort of guiding  
12 principles. This was from the workshop that we had  
13 on February 23rd, that's really looking more at the  
14 larger set of guidelines topics that we're going to  
15 be discussing.

16 There's another slide that'll show you what  
17 those topics were in that previous Staff paper. But  
18 really, for the guiding principles, you know, we've  
19 heard from the POUs and we understand there's a need  
20 for flexibility to consider local planning needs and  
21 local factors that impact what the IRPs will  
22 ultimately look like, but still making sure that  
23 they're meeting the requirements of SB 350 for the  
24 GHG reduction goals and the other -- like such as the  
25 50 percent renewables.

1           Looking to leverage and eliminate sort of  
2 duplicative data requests, so leveraging other  
3 reporting wherever possible, and then to the degree  
4 that is possible, trying to encourage consistency  
5 across the different utilities when they're  
6 reporting, to help provide a statewide sort of  
7 snapshot for policymakers.

8           And this is sort of the snapshot that I was  
9 talking about for the previous Staff paper that was  
10 published ahead of a February 23rd workshop that  
11 talks about the topics for the POU IRP guidelines  
12 that are currently being developed.

13           And really, that was a discussion paper that  
14 hit on a number of those topics you see on the slide  
15 here. There's a link at the bottom here, and really,  
16 just, you know, wanted to highlight that there was  
17 some good discussion at that workshop and in the  
18 written comments.

19           But I think today's discussion really does  
20 more of a deep dive on the Transportation  
21 Electrification piece to help you fill in some of  
22 that discussion. Just a quick overview of the  
23 process that we've taken to get here where we are  
24 today.

25           So there's been a number of workshops the

1 Energy Commission has conducted over the past year or  
2 so, and so starting on April 18th last year there  
3 was, you know, a big discussion of some of the POU  
4 recurrent planning processes and feeding into, hey,  
5 what are the ultimately guidelines going to look  
6 like.

7           We had a Transportation Electrification  
8 workshop in the fall and really started that  
9 discussion I think the Commissioners talked about.  
10 Then we had some specific topical workshops, one on  
11 December on the renewables and energy storage  
12 components of IRPs.

13           What's not on the slide here is that there's  
14 also been a big -- many discussions on the energy  
15 efficiency doubling target-setting piece, and that  
16 ultimately feeds into the IRPs, as well. And there's  
17 also a note here, you'll see at the bottom of the  
18 slide, that for the Energy Commission in 2017 the IRP  
19 discussion has been consolidated under the IEPR  
20 docket.

21           And so that's 17 IEPR 07, and so I think  
22 everyone's dialed in on that, but there's a link here  
23 on the bottom that shows you, you know, where all  
24 these things are coming together in 2017.

25           So the conversation continued this year. I



1 already mentioned that February 23rd there was a  
2 workshop. Actually, there were two workshops. The  
3 first was a discussion of how to -- potential  
4 methodologies to get to a GHG target for the  
5 electricity sector and for the CPUC jurisdictional  
6 entities and the POU's.

7           Then later in the afternoon there was a  
8 workshop that talked about the guidelines topics that  
9 would ultimately feed into the Energy Commission's  
10 draft guidelines that are being developed. There was  
11 a followup webinar on March 13th that really got into  
12 a little more of the specifics with stakeholders,  
13 with POU's about what their interests were and what  
14 their questions were about some of these proposed  
15 discussion topics.

16           And then again, yesterday we had the follow-  
17 on workshop to discuss with POU's specifically  
18 potential methodologies for getting to those  
19 individual GHG targets for use in IRP. And  
20 certainly, we're not done yet.

21           There are a lot of workshops slated,  
22 including the one today that everyone's here for.  
23 There is a Staff webinar this Thursday to discuss  
24 inputs, assumptions and administrative review for POU  
25 IRPs.

1           And really, this is looking at some of the  
2 specific tables and inputs and allowing for a deeper  
3 discussion on some of those pieces that will feed  
4 into the guidelines themselves. So I encourage  
5 everyone to tune into that if you're interested.

6           There's a second Transportation  
7 Electrification Workshop coming up on the 27th that's  
8 focused on the medium and heavy-duty sector, and all  
9 this is leading up to ultimately a workshop on May  
10 25th to discuss Draft Guidelines that will be posted  
11 in advance of that workshop.

12           And then taking comments from that workshop,  
13 pulling it all together and the Staff intends to have  
14 final guidelines for consideration of adoption at the  
15 July 12th Business Meeting for Commissioners.

16           So you know, and I mention this briefly, but  
17 there are a number of other efforts that are still  
18 ongoing that will ultimately feed into or factor into  
19 the POU IRP development; the GHG emission reduction  
20 targets that are being developed by the joint  
21 agencies.

22           A lot of the work that's being done on the  
23 energy efficiency doubling target-setting effort that  
24 will ultimately be completed after the guidelines,  
25 but is still very relevant for the discussion of

1 IRPs; the RPS Regulations to meet the 50 percent RPS  
2 for POU's are still being developed.

3           And then another factor that we heard  
4 discussed yesterday is the Power Source Disclosure  
5 Program, the AB 1110 Program, and the discussion of  
6 the GHG Accounting Protocol and how that factors into  
7 sort of helping to track progress towards the POU  
8 specific GHG goals. And that is the end of my  
9 presentation. So thank you.

10           MS. RAITT: Thanks, Mike. Next is Amy  
11 Mesrobian from the CPUC.

12           MS. MESROBIAN: Good morning, everyone. My  
13 name is Amy Mesrobian. I'm an Analyst at the  
14 California Public Utilities Commission, and my  
15 presentation today will be providing some additional  
16 context and background about the state's work in  
17 promoting Transportation Electrification.

18           So the CPUC, the California Public Utilities  
19 Commission, oversees, among other things, the  
20 electric investor-owned utilities. And we've been  
21 working with the IOUs over the past several years to  
22 develop EV rates, deploy EV infrastructure, a  
23 charging infrastructure and look at how to best  
24 integrate electric vehicles within the electric grid.

25           So today I'm hoping to share some of the

1 work that we've been doing with the investor-owned  
2 utilities to promote Transportation Electrification,  
3 pursuant to SB 350, with a goal of sharing some ideas  
4 and best practices with our colleagues at the CEC and  
5 POUs who may be working with -- working on similar  
6 investments as the IOUs.

7           And as the Commissioners noted, the agencies  
8 have all been working really closely over the past  
9 several years on SB 350 implementation, as well.  
10 Okay. So the CPUC has a slightly different role from  
11 the CEC in terms of implementing SB 350.

12           So since we more directly oversee the  
13 investor-owned utilities, in SB 350 there's language  
14 requiring the CPUC to direct the investor-owned  
15 utilities to file plans with us, to promote  
16 widespread Transportation Electrification.

17           And so one difference to highlight here is  
18 that the investor-owned utilities have to submit all  
19 of their proposals to us at the CPUC for our review  
20 and consideration. So based on the language in SB  
21 350 and our existing regulatory review process, we  
22 were thinking about what kind of direction we needed  
23 to provide to the investor-owned utilities for us to  
24 successfully review any of their applications that  
25 they proposed.

1           And that's where we developed some guidance  
2 that's pretty similar what the CEC is presenting  
3 today. So Commissioner Peterman put out a Guidance  
4 Ruling last fall, directing the utilities to provide  
5 certain information in their applications that  
6 they're filing to us, and the applications contain a  
7 whole portfolio of different projects and  
8 investments.

9           So the first piece of Guidance offered was  
10 to address some key areas in the areas of rate  
11 design, expanding the focus of the programs from  
12 light duty into the medium and heavy duty sectors, to  
13 make sure that we address air quality concerns, to  
14 leverage the results of previous pilots, completed  
15 both by the investor-owned utilities and other state  
16 funded programs and other national, international  
17 projects, as well, and to align with local, regional  
18 and state transportation planning and investment.

19           So again, just making sure that we're all  
20 coordinated in our investment strategy to bring the  
21 best results for the state, and of course, promoting  
22 safety. So in thinking about the scale and scope of  
23 the applications that we were looking for from the  
24 investor-owned utilities, we wanted them to propose  
25 programs that would help get us to our long-term

1 greenhouse gas emissions reduction goals.

2           And so we wanted them to think about what  
3 those goals were and use that target to develop  
4 programs that would get to those greenhouse gas  
5 emissions reductions. And we also wanted the  
6 utilities to target different sectors, both with  
7 pilots and programs, to make sure to get experience  
8 in different sectors and start making sure that  
9 markets and technologies are developed in all the  
10 sectors that we need to meet our state's ambitious  
11 Transportation Electrification goals.

12           So additionally, in the Guidance Ruling we  
13 included minimum projects descriptions from each of  
14 the utilities' proposals. So when the utilities  
15 filed applications with us we required all of this  
16 information so that we could evaluate it in our  
17 public process.

18           So this description included things like the  
19 market segment and the vehicles targeted. So this  
20 could be something like port equipment, the time  
21 frame, so how long the project would take to  
22 implement, relevant regulations that the project  
23 would help meet or would be supported, the number of  
24 vehicles supported by the project, a plan for  
25 monitoring the success, evaluating the program,

1 determining what the lessons learned are to either  
2 scale up or not continue with the pilot.

3           What the total costs of implementation are  
4 and how that impacts rates and ratepayers; what the  
5 additional grid impacts are from their proposal; how  
6 that could be mitigated by price signals or other  
7 load-shaping mechanisms; how they might integrate  
8 renewables with their project and how they could  
9 encourage charging at the right time to maximize  
10 their assets and proof load factor.

11           We also asked them to identify project  
12 partners and all their funding sources that they  
13 could leverage so that they can make their dollars  
14 and their ratepayer dollars go as far as possible.  
15 And we are looking for emissions benefits from each  
16 of the proposals in terms of greenhouse gas and  
17 criteria pollutants and a particular accounting  
18 methodology to make sure that we think that's a  
19 reasonable estimate, so we know how to gauge if we're  
20 on track to meeting our larger goals.

21           And then finally, something that's important  
22 for utilities is mitigating the risk of stranded  
23 assets. So we want to understand what their plan is  
24 for that mitigation. So again, that Guidance went  
25 out in the fall of 2016.

1           These are all the things we asked for the  
2 investor-owned utilities to provide us in their  
3 applications. And so in January of 2017 the three  
4 largest investor-owned utilities that we oversee,  
5 Pacific Gas and Electric, San Diego Gas and Electric  
6 and Southern California Edison, submitted  
7 applications to the CPUC.

8           And basically, they requested, the big blue  
9 slice is about \$3/4 billion of funding in the heavy  
10 duty -- medium and heavy duty sectors and about a  
11 \$1/4 billion for the light duty sector and other kind  
12 of related programs.

13           And so I wanted to share this just to kind  
14 of give everyone a sense of what's going on in the  
15 investor-owned utilities space to the extent that  
16 they're interesting projects or they're lessons  
17 learned that we can share with the POUs.

18           So I put this graphic sort of mostly for  
19 reference. I don't really want to go through it here  
20 today, but just to give you a sense of the different  
21 types of projects that the investor-owned utilities  
22 are proposing.

23           So they roughly break down into  
24 infrastructure to support medium and heavy duty  
25 vehicles, infrastructure to support residential



1 charging, infrastructure to support things like  
2 airports and ports that are off-road, public DC fast-  
3 charging, taxi and ride-sharing incentives and  
4 education and outreach.

5           So our next steps at the CPUC are basically  
6 to continue to review and analyze the utility -- the  
7 investor-owned utility proposals and make a decision  
8 later this year about which ones we would like to see  
9 move forward and if we need to modify any of them to  
10 maximize benefits before moving forward with them.

11           We also have three smaller investor-owned  
12 utilities under our jurisdiction and they're going to  
13 be proposing their applications this summer. So  
14 again, you know, one thing that we're thinking about  
15 is some of the smaller, publicly-owned utilities  
16 might share some characteristics with the smaller  
17 investor-owned utilities that we regulate.

18           So there might be good opportunities to  
19 share information and lessons learned in project  
20 ideas across those two groups. And just like the CEC  
21 is doing, at the CPUC we have a process to develop  
22 the integrated resource planning process that the  
23 investor-owned utilities will be working on.

24           And so specifically related to  
25 Transportation Electrification, I think there are a

1 few questions that we're hoping we'll answer related  
2 to the investor-owned utilities. So if we're  
3 thinking about Integrated Resource Planning and  
4 maximizing our greenhouse gas emissions reduction per  
5 dollar of program, maybe one thing that IRP can help  
6 us figure out is how much Transportation  
7 Electrification should we do.

8           How much funding should we put towards it?  
9 What are the greenhouse gas emissions reductions we  
10 can expect from it, relative to some of the other  
11 programs in the investor-owned utilities portfolios?  
12 And then another question that we have is, what's the  
13 value of flexible electric vehicle charging.

14           So if utilities can give the right  
15 incentives to customers to charge at different times  
16 of day, what's the value to the grid and what are the  
17 greenhouse gas emissions reductions values associated  
18 with some of those things.

19           So those are some of the things that we're  
20 thinking about. And again, to the extent that the  
21 POUs and IOUs can share lessons learned, I'd  
22 definitely be happy to facilitate that, and the CPUC  
23 will continue working with CEC, as well.

24           So I have my contact information and info  
25 for my colleague, Carrie Sisto, if you have any

1 questions. Thank you.

2 MS. RAITT: Great. Thank you. Next is  
3 Alberto Ayala.

4 MR. AYALA: Okay. Thank you. Good morning.  
5 Thank you very much for this very kind invitation. I  
6 have to say it's a distinct honor for me to be here  
7 before the Commissioners to give you our perspective  
8 on what's going on with respect to the Air Resources  
9 Board's Clean Vehicle Rules, which as I'm sure you  
10 are aware of, have been in the news recently.

11 So I will go through a few of those details,  
12 but before I do that I do want to take the  
13 opportunity to thank both the Energy Commission, as  
14 well as the PUC, for your support in building a very  
15 strong collaboration between our agencies.

16 You know, besides the fact that SB 350 is  
17 calling on us to work together, I think it speaks  
18 very well to the leadership at all three agencies,  
19 the fact that we've developed such a strong and  
20 effective collaboration, and I just wanted to make  
21 that noted today before I start my remarks. It's  
22 certainly a good process.

23 I was asked to give you an update,  
24 specifically, on our light duty clean vehicle  
25 policies. So I'm going to spend a little time going

1 into some of the detail related to what we call our  
2 midterm review, which has been the subject of some  
3 press coverage.

4 But before I do that, I do want to set the  
5 stage and I think Dr. Weisenmiller and the other  
6 Commissioners, I think you set it up very well for  
7 me. Why are we pushing so hard, so aggressively, in  
8 getting our state to full electrification of  
9 transportation, starting with the light duty sector.

10 As you noted, it's all about clean air for  
11 every Californian. It's also about the fact that  
12 California has stated that climate change is real and  
13 we are going to step up and do something about  
14 greenhouse gas emissions.

15 There's a third benefit and that's what I  
16 call the trifecta environmental benefit of  
17 sustainable transportation, and this third benefit  
18 doesn't get talked about as much as the other two,  
19 and that is, we're also mandated as policymakers to  
20 mitigate the human exposure to toxic combustion  
21 emissions.

22 And you know, the best example is, you know,  
23 the type of exposure that you get when you're on a  
24 busy freeway or a busy roadway, all those emissions  
25 lead to excess exposure that we are mandated to

1 mitigate.

2           So when you consider zero emission vehicles  
3 and zero emission tailpipe emissions, not only do we  
4 make progress towards our clean air and climate  
5 protection goals, but also, we reduce exposure.

6           And if you wanted to take that to a  
7 different extent, I should also be talking about a  
8 fourth benefit, which recently for my agency has been  
9 a very important aspect. And that is, as we engage  
10 more openly in the wake of the Volkswagen cheating  
11 scandal, zero emission vehicles also are cheat proof.

12           So there is no cheating. There is no  
13 significant expense in terms of public resources  
14 making sure that we adopt stringent standards, and  
15 that the auto industry that is subject to those  
16 standards actually follows the rules.

17           So great benefit for us all, societal and  
18 otherwise, from electrification transportation. The  
19 other important point that I want to make before I  
20 launch into the details is the fact that the Air  
21 Resources Board has made well known the fact that the  
22 regulation itself, policies that are command and  
23 control, play a very important role.

24           But when we consider the challenge of  
25 electrifying our transportation sector we fully

1 recognize, and clearly, the fact that I'm here with  
2 the CEC and the PUC today speaks to this, we clearly  
3 recognize that we need actions beyond just the  
4 regulation.

5           And that's why supporting infrastructure,  
6 deployment, supporting consumer awareness and  
7 education and doing what we can to join efforts with  
8 other leading jurisdictions around the world that  
9 have policies and think like we do, why it's so  
10 important for us to promote those partnerships,  
11 because it's all about scale.

12           The way that we're going to address the  
13 number one barrier to Transportation Electrification,  
14 which is cost of the technology, is through economies  
15 of scale. So we just got to get the numbers out so  
16 that we can reduce the cost.

17           And again, why I'm here today is to  
18 communicate in the most clear and strongest of senses  
19 the fact that the role that electric utilities and  
20 other entities need to play in helping the state  
21 achieve our electrification transportation goals is  
22 absolutely essential. We cannot do it without the  
23 utility engagement.

24           So the first point that I was asked to  
25 describe for you briefly is our midterm review and

1 the Board's final determination. So what is the  
2 midterm review? That is just a fancy name, but  
3 basically, the standards in question were adopted  
4 both nationally and in California back in 2012.

5 So as policymakers you can appreciate the  
6 work that goes into adopting the standards. That  
7 means the technical work that went into the  
8 standards, we finished that in about 2010. So the  
9 point of the midterm review was simply to acknowledge  
10 the fact that we were putting in place requirements  
11 that went all the way out to 2025.

12 We're likely bound to miss something or new  
13 information is going to emerge. New technology is  
14 going to come to the marketplace. We committed  
15 ourselves to doing a checkpoint, midpoint along the  
16 way and that's really what the midterm review is all  
17 about, is simply asking the question, are the  
18 standards as adopted back in 2012 still appropriate.

19 And you hear about the one national program,  
20 ONP, that was achieved when California agreed under  
21 its unique authority to align the requirements with  
22 the Federal Government, so that today the standards  
23 in place are essentially one national program, which  
24 again, hasn't happened often in the past, but we  
25 acknowledge that the national program was going to

1 deliver the benefits in terms of criteria, emissions,  
2 reductions and greenhouse gas emission reductions  
3 that we were interested in.

4           So before I tell you what the Board's  
5 decision was, let me review for you quickly what the  
6 actual standards under review are. So for California  
7 there's three components. The first one obviously is  
8 the greenhouse gas emission limit.

9           So this is a limit that gets applied to  
10 passenger cars, light duty trucks, the lighter ones  
11 and the heavier ones. So think of pickup trucks and  
12 the like. The number in terms of carbon emissions is  
13 166 grams per mile.

14           So that's a number that is not often  
15 recognized. What you see in the paper is the now  
16 famous President Obama's 54.5 miles per gallon. In  
17 terms of reductions, what the state was seeking is  
18 about a 34 percent reduction from the baseline.

19           In addition, in California we were also  
20 reviewing what is today the most stringent PM  
21 emissions standard in the world, and that is the one  
22 milligram per mile. That's really, really low. And  
23 as somebody who's spent a lot of time in the  
24 emissions lab, I like to say we have a really good  
25 problem on our hands and that is, the emissions are



1 so low it's really hard to measure them, which is  
2 great to say.

3           The third component of our midterm review,  
4 which is probably the one that you're most interested  
5 in, is the ZEV requirement, the so-called ZEV  
6 mandate, which briefly was calling for about 15  
7 percent of all new car sales in 2025 to be what we  
8 define as zero emission vehicles.

9           So this is battery electric, fuel cell  
10 electrics and the plug-in hybrids. And all three  
11 requirements are blended into this one policy, which  
12 we call the Advanced Clean Cars Program. So it's  
13 basically just a simple, coordinated approach where  
14 we keep track, we do the accounting in terms of, you  
15 know, when you reduced the emissions on the carbon  
16 side what does that do to the criteria side, what  
17 have you.

18           How did we conduct the evaluation? It was a  
19 multi-year, three agency process because California  
20 agreed to collaborate with both EPA and NHTSA on the  
21 midterm review. So at the end I think the tally of  
22 those of us, career Staff at the three agencies, was  
23 probably north of 150 people spending technical time  
24 on the analysis.

25           It is to date the most robust, most

1 extensive, fact-based, technical analysis of the  
2 standards. And we benefitted not only from the  
3 agencies' work, but also lots of great input from the  
4 academic community, from the NGO community and from  
5 many others that obviously see the importance of the  
6 standards.

7           So what did the Board say? The final  
8 determination that the California Air Resources Board  
9 reached less than a month ago was essentially the  
10 same as the previous EPA. And the Board agreed with  
11 the Staff recommendation and determined that the  
12 standards were appropriate.

13           So the Board decided not to change any of  
14 the existing requirements for 2025, and that includes  
15 the greenhouse gas standards, the PM standards and  
16 the ZEV requirements. So that basically is a  
17 statement of confidence from the Board in terms of  
18 the technical analysis that the Staff conducted.

19           Interestingly, the record actually would  
20 have supported more stringency, because we have seen  
21 lower costs and more technology come into the  
22 marketplace than we anticipated. So the question in  
23 your mind should be, how come the Board didn't decide  
24 to pursue more stringency. I'll get to that point in  
25 a minute.

1           What they did tell us, and this gets to that  
2 issue, is the Board directed us to accelerate and do  
3 whatever we can as an agency working with you and  
4 others, these complimentary policies that are not  
5 regulations; so anything we can do to support  
6 infrastructure, anything that we can do to enhance  
7 consumer awareness and education.

8           So it's basically continuing and doubling  
9 down on the efforts that we have so successfully been  
10 working on together. The action that the Board took  
11 completely and officially closes the midterm review.  
12 So for us, we're not looking back anymore.

13           We're looking forward, and that's really why  
14 the Board decided not to do anything to the  
15 standards, because what the Board told us is they  
16 gave us direction to begin today working on the next  
17 set of standards, which will come for the model year  
18 2026 and beyond.

19           And this gets exactly to the point of your  
20 Workshop. The reason we want to focus on the 2030  
21 standards is because this is going to be our down  
22 payment on the 350 commitments for the 2030  
23 reductions.

24           So to the extent that, as Chair Weisenmiller  
25 stated, transportation will continue to contribute

1 significantly to our carbon footprint, the Air  
2 Resources Board 2026 standards will be the  
3 contribution to how do we meet that target, and I  
4 want to make that very clear.

5           Now, the final question, and again, I used  
6 one of the many newspaper articles that were written  
7 on it. What does this mean in terms of what the new  
8 EPA, the Trump EPA, is wanting to do? For us it's  
9 simple. We are willing to come to the table and we  
10 are ready to engage, to the extent that we can learn  
11 anything and there is useful information to us, for  
12 the 2026 standards and beyond.

13           If the auto industry and their actions are  
14 going to pursue relaxing existing standards, if they  
15 want to focus on issues that to us have been fully  
16 addressed, frankly, the Air Resources Board has no  
17 place at that table.

18           So from our perspective, as of right now we  
19 have not gotten an official invitation from anyone,  
20 the administration or the White House. But again, in  
21 our view we're moving ahead, because frankly, we  
22 don't have a lot of time to waste.

23           You asked about the Scoping Plan and how  
24 this fits into it, and as I just stated, the light  
25 duty electrification programs are basically one of

1 the fundamental building blocks in terms of the  
2 scenarios that we describe in the Scoping Plan for  
3 meeting, not only the 2030 target, but most  
4 importantly, this will put us on track for the 2050  
5 long-term target.

6           And what does that look like? The 2030  
7 target is going to be a monumental challenge for us  
8 all. No question. Let's not sugarcoat the  
9 challenge, because as we have done our analysis very  
10 similar to what your own staffs are doing, and again,  
11 we welcome the opportunity to coordinate the  
12 technical analyses and the tools, for us to be able  
13 to stay on track and meet our multiple goals we're  
14 looking at more than 4 million ZEVs on the road by  
15 2030.

16           And you know, if you consider that best case  
17 scenario in 2025 we're going to get to 1½ million,  
18 you know, here we are facing yet another hockey stick  
19 approach, which we have all been fighting not to do  
20 again. Now, there's a lot that can be gained by  
21 continuing that collaboration.

22           And clearly, we want the auto industry to  
23 engage with us in a constructive way, because the  
24 challenge we have is one that we're going to need  
25 everyone's good ideas to be able to come up with a

1 sensible policy that clearly reflects the realities  
2 of the market today and in the future, and at the  
3 same time allows us to meet our targets.

4           So that's basically our focus. Where we do  
5 from here is, our direction from the Board was clear,  
6 we committed to come back to the Air Resources Board  
7 with the next set of standards no later than 2020.  
8 You may say that's a long time, but I do feel that we  
9 have a good, solid two years of technical work that  
10 needs to be done.

11           There's a lot of thinking that needs to be  
12 had. We have some near-term issues that we have to  
13 deal with, and we also have some long-term emerging  
14 trends in the auto industry, like autonomous and  
15 connected vehicles, and car-sharing and all those  
16 exciting things that we're all hearing about.

17           My goal, and I'm going to do whatever I can  
18 in my role at the Air Resources Board, is to come up  
19 with the best and smartest policy that achieves the  
20 goals that we have for protection of the environment,  
21 but at the same time guides these emerging trends in  
22 the right direction, because my fear is these trends  
23 in the auto industry are going to happen no matter  
24 what we do.

25           And I don't want us to be on the sideline.

1 I want us to be actively engaged, and hopefully,  
2 guide the policies that will set the stage, not only  
3 for our country, but for the world. So thank you  
4 very much for this opportunity.

5 MS. RAITT: Thank you, Alberto. Next, we  
6 have Noel Crisostomo, to talk about the Draft  
7 Transportation Electrification Guidance for POU's.

8 COMMISSIONER SCOTT: Right before Noel jumps  
9 in I do just want to say, thank you so very much to  
10 Alberto from the Air Resources Board, for providing  
11 that fantastic presentation, and for the good  
12 partnership between our agencies working together and  
13 to Amy, as well, from the PUC for providing an  
14 excellent presentation and our partnership working  
15 together, because these issues are complicated.

16 It does require all of our agencies to work  
17 together in collaboration and be good partners, and I  
18 would echo the fact that I think that we are doing  
19 that. I think the scene-setting that we just did was  
20 fantastic, the presentation from Mike talking about  
21 what the Energy Commission is doing and Amy to talk  
22 about what the PUC is doing and how we can coordinate  
23 key components of that, and then Alberto with the  
24 context for why we're doing all of this and why it's  
25 so important. So I just wanted to highlight that

1 before we transition to Noel.

2 MR. CRISOSTOMO: Thanks, Commissioner. My  
3 name is Noel Crisostomo. I'm an Air Pollution  
4 Specialist in the Fuels and Transportation Division  
5 of the CEC, and thank you for coming to the Workshop  
6 today.

7 And I'll be presenting on the Guidance for  
8 Transportation Electrification for the POU's  
9 Integrated Resource Plans. We have a copy of the  
10 Draft Guidance out on the table. So I'm hoping that  
11 everyone has a copy of that.

12 The outline of my presentation is to provide  
13 a policy background for Transportation  
14 Electrification from the CEC's responsibilities, and  
15 to set an objective for our TE planning for the POU's.  
16 Next, I'll overview the recommended information data  
17 and reports that are detailed in the Draft  
18 Guidelines, and third, I'll end with some thematic  
19 questions for today's discussion, which will engage  
20 with technology providers, stakeholders from  
21 industry, and of course, the publicly-owned utilities  
22 who will be responsible for submitting plans and  
23 implementing programs.

24 So I'll reference first the Guiding  
25 Executive Order from 2012 in which Governor Brown



1 ordered the agencies to establish benchmarks for  
2 essentially a transformation of our sector -- of the  
3 transportation sector towards zero emission vehicles.

4 In particular, the Energy Commission is  
5 helping to achieve by 2020 a number of these  
6 mandates, including infrastructure supporting 1  
7 million zero emission vehicles by 2020, increasing  
8 cost competitiveness between ICE vehicles and plug-in  
9 vehicles, accessibility to mainstream consumers,  
10 widespread electrification of the transit and freight  
11 sector, overall reduced greenhouse gas emissions on  
12 the order of 80 percent reductions in the sector by  
13 2050, grid integrated charging infrastructure, and an  
14 expanding private sector role to support new jobs in  
15 the electrification of our transportation.

16 More recently Senate Bill 350 requires the  
17 POU's consideration of Transportation Electrification  
18 in their IRPs. And as Mike discussed earlier, there  
19 are a few important points to highlight. The POU's  
20 shall, "address procurement of Transportation  
21 Electrification among other resources in their  
22 integrated plans."

23 They have to meet the goals of Public  
24 Utilities Code section 454.52, sections (a) (1) (C)  
25 through (H), which regard distributed energy resource

1 integration, improvement in distribution system,  
2 diversity, reducing impacts on rates, reducing  
3 greenhouse gas emissions and improving air quality to  
4 support our disadvantaged communities who are  
5 disproportionately impacted by emissions.

6           Lastly, the CEC under the section of the  
7 Senate Bill, may adopt guidelines to govern the  
8 submission of information and data and reports needed  
9 to support the CEC's review of the POU's integrated  
10 plans.

11           When we combine those two frameworks, SB 350  
12 and the Executive Order, the POUs, in our opinion,  
13 can provide indispensable contributions to  
14 Transportation Electrification in the state through  
15 an integrated resource plan.

16           Thus, we recommend that, as I'll be going  
17 through in the next slides, that the following  
18 information, data and reports to serve as a best  
19 practice benchmark, for the POUs to support their  
20 contributions to the state's transformation.

21           We'd like them to support charging  
22 infrastructure that is integrated with the  
23 electricity grid, enables widespread electrification  
24 of all segments in order to reduce greenhouse gas  
25 emissions and air pollution with what Alberto was

1 saying in the last panel.

2           The following slides and the Guidance that  
3 was published last week build upon the Draft Staff  
4 Paper that was released in February and the Proposed  
5 Guideline Topics for POU IRPs. And so it elaborates  
6 upon that draft paper in terms of additional data and  
7 detail to help the POU's understand what -- or help us  
8 convey what we think could be helpful for the POU's to  
9 report.

10           So in developing these Guidelines we  
11 recognize a few really important points, and I want  
12 to emphasize them here. The additional information,  
13 data gathering, analysis and its incorporation into  
14 programs, will require additional time and resources.

15           That fact is not lost upon us and we want to  
16 be able to be flexible and to recognize the POU's  
17 independence in developing their IRPs, given the  
18 really diversity of time and constraints faced by  
19 each POU.

20           To this point, we did account for the need  
21 for recognizing diversity in the priorities. From a  
22 local level POU's are regulated by independent boards  
23 at the municipal level, with different capabilities,  
24 resources and focuses on technology.

25           This is because no POU or utility's alike,

1 and so we want to emphasize the need to remain  
2 flexible in this respect. Thirdly, POU's  
3 electrification analyses, plan preparation and  
4 eventual accommodations of these new customer loads  
5 is an evolving and ongoing process.

6 This is not going to be an easy  
7 transformation of the state's single largest source  
8 of greenhouse gas emissions. So we really look  
9 forward to working with the POU's in these planning  
10 efforts.

11 So one of the themes of this day and one of  
12 the theses of the plan -- of the Guidance is to  
13 welcome your ideas and explore how the Energy  
14 Commission support the POU's individual progress  
15 towards widespread Transportation Electrification.

16 And as I go through the next slides in  
17 detail, please refer to the Staff Proposal so that I  
18 don't bore you with every single bullet point. So  
19 the first area of the IRP information was to  
20 quantify, characterize and locate Transportation  
21 Electrification load.

22 This includes the need to identify the  
23 number and types of Transportation Electrification  
24 vehicles, charging infrastructure and customers.  
25 Associated with each of those things are the need to

1 characterize the load that is being consumed, energy  
2 and demand, and the tariffs that are characterizing  
3 the behaviors of customer charging.

4 In addition, from this electric use, of  
5 course, there are greenhouse gas emission and air  
6 pollution reductions for the state on the whole,  
7 although there is a fuel switching effect there. And  
8 so we want to understand the methodology that is  
9 being used for accounting.

10 The guidelines reference the need to align  
11 with the ARB's inventory, which provides a rigorous  
12 process for accounting for the different types of  
13 electrification in the state. The ARB inventory  
14 linked in the paper provides an example of the  
15 economic sector analysis, in addition to a proposal  
16 for IPCC or Scoping Plan categories for the  
17 inventory.

18 The next area in the report is the need to  
19 identify Transportation Electrification programs.  
20 This provides some qualitative -- a qualitative  
21 aspect to an otherwise potentially data-heavy set of  
22 information or set of reports.

23 But we want to provide the POUs an  
24 opportunity to talk about their investments,  
25 incentives, tariffs or rates -or generally- programs

1 that they're using to help encourage electrification.  
2 We would like them to also specify what types of  
3 market barriers they're hoping to overcome with  
4 solutions that they would provide to their customers,  
5 and to explain how they are prioritizing  
6 disadvantaged communities.

7           Pictures here are just of highlights from  
8 the Center for Sustainable Energy's implementation of  
9 the Clean Vehicle Rebate, in which LADWP and SMUD are  
10 doing pretty well among all other utilities, all  
11 other major utilities, in terms of getting people on  
12 -- getting people knowledgeable of EV rates to ensure  
13 economic effectiveness of their investment in EVs.

14           But we also understand that not all  
15 utilities in the state have TOU rates or advanced  
16 meter infrastructure. And so we have to think about  
17 how we can insure that economic effectiveness. In  
18 addition, this is a screen shot of a sector of the  
19 state, the South Coast around Los Angeles, that will  
20 be recurring throughout the other slides just to show  
21 how diverse and impacted the South Coast is in terms  
22 of the air pollution that we have to mitigate. Here,  
23 I highlight disadvantaged communities.

24           A third part of the Guidelines are the need  
25 to explain how the TE programs have been prioritized

1 and leverage external funding. First, prioritization  
2 is an important point to emphasize in order to  
3 address the POUs specific emissions inventory.

4 One of the challenges with electrification  
5 is that it's hard to use rules of thumb in assuming  
6 that the POUs have 20 percent of the load, therefore,  
7 they will have 20 percent of the transportation. As  
8 we saw previously, there might be really important  
9 corridors for ports or transportation infrastructure  
10 that lead to interstate or intrastate commerce.

11 And charging stations along the way to  
12 accommodate these mobile sources will be a dynamic  
13 problem that we haven't really addressed yet. In  
14 addition, funding leverage is really important in  
15 order to reduce ratepayer impacts.

16 POUs generally are much smaller than the  
17 investor-owned utilities, and everyone has different  
18 carrying capacities from a rate perspective. And so  
19 we have to understand how the POUs will strategize,  
20 bringing in external sources of funding and align  
21 with state efforts to support electrification.

22 Fourth, education and outreach. We'd like  
23 to understand how the POUs will qualitatively engage  
24 with their customers to get the programs, make the  
25 programs successful. In particular, we'd like to

1 have them specify any focus or particular  
2 coordination efforts for facilities counting for  
3 large portions of mobile source emissions.

4           This graph is not a -- this map is not  
5 identifying mobile source emissions, but stationary  
6 emissions using the ARB's integrated emissions  
7 visualization tool. But to my point previously, we  
8 might have distribution centers or stops along inter-  
9 regional corridors, which would be really important  
10 to reduce freight emissions or to enable long travel  
11 across the state. One hope is to identify where  
12 these key sources of emissions are.

13           Fifth, a need to align with state policy and  
14 with local needs. So the Draft Guidelines provide  
15 just a smattering of different state reports that  
16 have been guiding documents in planning for  
17 electrification. We'd like to understand how the  
18 POUs are leveraging those objectives and strategies.

19           And in addition, because the POUs might be  
20 small, and this is an example of, again, the South  
21 Coast, where you have many cities and dozens of POUs  
22 within two hours of driving distance, there might be  
23 a need to coordinate across utilities, even with the  
24 IOUs, as Amy had mentioned, to insure that regional  
25 and infrastructure needs are coordinated, investments



1 are effective and to insure that charging statements  
2 and the customer experience are accessible,  
3 interoperable and easy.

4 Sixth, and finally, the POU Guidelines  
5 suggest coordination with -- the coordination of the  
6 Transportation Electrification Programs with  
7 distributed energy resources. So the Guidelines  
8 request a description of how TE is going to help  
9 overall DER planning efforts to insure that our  
10 charging behaviors are consistent with the electrical  
11 grid conditions, which are quickly changing.

12 So this is a graph from yesterday's ISO  
13 renewables watch, which shows that just generally we  
14 could potentially add charging during the middle of  
15 the day to absorb wind and solar and to reduce the  
16 net ramp, as well as potentially provide peak rates  
17 or dispatch demand response to reduce the head of the  
18 duck.

19 So again, I'd just like to reemphasize the  
20 need to, one, to review the Guidance for detail and  
21 to emphasize the -- our attention to the need for POU  
22 flexibility, independence and our ultimate desire to  
23 provide insight to both POU and state investments in  
24 electrification.

25 So I'll close with some thematic questions

1 for discussion later today. So we'd like to pose  
2 some hypotheticals.

3 What about the benchmarks and Guidance are  
4 unhelpful or helpful in planning for electrification?

5 What can be used to inform change in grid  
6 operations? What can most effectively be used to  
7 communicate the POUs' contributions to the statewide  
8 effort and to communicate your needs for assistance  
9 to the Energy Commission?

10 What would be better enhanced by referencing  
11 other reporting conventions or modeling conventions?  
12 What could be made consistent across the utilities to  
13 Commissioner Scott's point, to enable appropriate  
14 head to head comparisons reflecting -- that account  
15 for differences in POUs?

16 And lastly, how could the Guidance treat the  
17 evolving Transportation Electrification industry that  
18 we're be discussing today in terms of forecast and  
19 charging technologies? What types of information or  
20 narratives are needed to ensure that these IRPs are  
21 helpful for the five-year time planning horizon that  
22 we're asking for them?

23 So more discussions will follow during the  
24 afternoon panel, but I look forward to speaking with  
25 you and hearing feedback throughout the day. And

1 with that, any questions? I welcome any comments or  
2 questions.

3 CHAIRMAN WEISENMILLER: Yeah. I have a  
4 question. Couple weeks ago I was in Los Angeles and  
5 Ron Nichols was giving a presentation before me, and  
6 Ron indicated that Edison has 40 percent of the DACs  
7 in their service territory.

8 And shortly after that LADWP said they had a  
9 lot. And I guess one of the questions is, going back  
10 to the DACs for the POUs, be useful to get a sense of  
11 the percentage of the DACs in the POU service  
12 territories, and particularly, which ones have the  
13 most. Similar to what Ron -- you know -- the 40  
14 percent number from Ron.

15 MR. CRISOSTOMO: I have heard that Edison  
16 stat before and I have ran numbers to confirm that.  
17 It really depends on the locations of the POUs and  
18 how they overlay with the economic and air pollution  
19 considerations of the CES layers, but we can start  
20 running that.

21 CHAIRMAN WEISENMILLER: That'd be good.

22 COMMISSIONER PETERMAN: Noel, thank you for  
23 the presentation. I'll just note, I really like the  
24 Guidance, too, for the POUs to provide information  
25 about their Transmission Specific Emissions

1 Inventory, because you can imagine, there could be  
2 real variation. And that's going to be helpful for  
3 us as we're seeing, you know, what are the POUs that  
4 have a lot of light duties and where are they  
5 focusing versus POUs closer to ports and things like  
6 that. So I think that it's going to be very  
7 informative.

8 MR. CRISOSTOMO: Yeah. I'd like to echo  
9 that point. It's going to be a real challenge to  
10 kind of map the electrical service areas with the  
11 different types of jurisdictions that are involved in  
12 Transportation Electrification, including Air Quality  
13 Management Districts or air basin areas, county  
14 level, or cities-- all those interact in a way that  
15 we don't really have information about yet.

16 COMMISSIONER PETERMAN: I'm hoping  
17 ultimately, as you saw from Amy's presentation, our  
18 Staff is organized its thinking along with these  
19 technology categories, medium, heavy duty, light duty  
20 and also a kind of rate design.

21 So I'm hoping I'll be able to look at the  
22 POU proposals or plans and be able to see them also  
23 in that way, so we can have a sense of across all  
24 utilities, what is the medium, heavy duty  
25 infrastructure investment, what's the light duty

1 investment, et cetera.

2 COMMISSIONER SCOTT: Okay. Thank you, Noel,  
3 for this excellent presentation. And I'll underscore  
4 what Commissioner Peterman just said, actually, and  
5 you highlighted it as you went through your thematic  
6 questions.

7 But I do think that to the extent that we  
8 can be consistent about what's being reported and how  
9 it's being reported I think will be incredibly  
10 helpful, even things as basic as, like, how are we  
11 counting charge points, and are we reporting things  
12 in kilowatt hours or in kilowatts.

13 And I think there's a few things like that,  
14 that sound pretty basic, but will actually at the end  
15 of the day when you kind of roll them up and you're  
16 trying to look across the IRPs will really help  
17 people to compare, just as you said, these apples to  
18 apples, versus having to do different conversions or  
19 dig really deeply into a methodology to understand  
20 how one IOU calculated something differently than  
21 maybe POU did or vice-versa.

22 MR. CRISOSTOMO: Okay. So I guess we can  
23 call Tim to introduce the next panel.

24 MR. OLSON: Hi. My name is Tim Olson, with  
25 the Fuels and Transportation Division, and I'm going

1 to introduce the next two speakers. To begin with,  
2 some of the questions POU's wrestle with include how  
3 much electric vehicle growth will occur in their  
4 service areas, when will the growth occur and which  
5 submarkets might experience that growth.

6 Of course, insights about these questions  
7 provide critical information about the need for  
8 electric vehicle charging infrastructure investment,  
9 how much is needed, whether that's government  
10 incentives, private investment or in this case POU  
11 rate basing and their investment.

12 Next two speakers are distinguished in their  
13 field in conducting and publishing independent  
14 analyses, highlighting scenarios for the electric  
15 vehicle growth worldwide. We are interested in their  
16 conclusions about California's markets today.

17 Alejandro Zamorano is a member of the  
18 Electric Transportation Group at New Energy Finance,  
19 and Derek Jones is an Associate Director with  
20 Navigant's New Energy Practice. We asked both  
21 speakers to respond to questions we raised in advance  
22 and look forward to their insights.

23 We are pleased to have them here today.  
24 Welcome, gentlemen, and we'll begin with Alejandro  
25 and then proceed to Derek. And the Commissioners may

1 have questions after your presentation, but when  
2 you're finished please sit at the table. Please find  
3 a seat at the table and there may be followup  
4 questions.

5 MR. ZAMORANO: Thank you very much. As Tim  
6 said, my name is Alejandro Zamorano. I'm an analyst  
7 with Bloomberg Energy Finance. I've been tracking  
8 the transportation market for about seven years now,  
9 for about two and a half year in California and based  
10 out of San Francisco.

11 So I'm going to talk -- you know -- the  
12 first thing I want to talk about is how 2016 ended,  
13 globally and in the U.S., and then how we see 2017  
14 forming. And then we'll get into much more long-term  
15 views that we have developed and how we see that  
16 industry, at least the markets for EVs, moving in the  
17 next 20 years.

18 So the wrap up of 2016 in North America was  
19 actually pretty good. As you can see, of the top  
20 five selling models, four grew in number of sales.  
21 Only one few, which was the Nissan Leaf. It's, you  
22 know, one model that we are looking forward for an  
23 update coming up this year or early next year.

24 But overall, a lot of green. If -- you get  
25 data easier when you're looking at colors, and from

1 what you can see in this light. From a global point  
2 of view, growth in sales was 55 percent between 2015  
3 and 2016.

4 You can see here that China is still showing  
5 the strongest growth, followed by Europe and followed  
6 by the United States. For 2017 we expect slower  
7 growth compared to what we saw in 2015; actually,  
8 compared to what we saw in 2014, 2015 and 2016.

9 This is not necessarily taking a view on  
10 political environment, but more a view on, you know,  
11 a much larger base that we're starting from compared  
12 to the previous years. For 2017 we expect close to  
13 40 percent growth in sales or new sales, and by the  
14 end of this quarter that we're on now in 2017 we  
15 expect about -- we hope that 2 million EVs on the  
16 road mark to be achieved.

17 For the U.S. in 2017 we see roughly 240,000  
18 new units being sold, based on what most of the OEMs  
19 have said. The trends are two very large markets  
20 looking up, as the European and the Chinese vehicle  
21 and EV markets are, and two moving sideways, one  
22 potentially decreasing, which is the Japanese market.

23 In the case of the Japanese market it's more  
24 related to the vehicle market than it is to EVs  
25 themselves, and that's a trend that we've seen for



1 the last at least four years. But then in the  
2 American market, even though we say it's moving  
3 sideways, we're still expecting some growth.

4           So it's not -- you know -- our predictions  
5 for 2017 are not completely negative. Now, let's  
6 take a look at the longer view. Two main drivers we  
7 see in our long-term assumptions, the first one is  
8 what's happening with technology, especially with  
9 what's happening on batteries, and the second one,  
10 which is a much more recent view and the one we're  
11 working very -- you know -- we're looking very  
12 closely at, which is what's happening with mobility.

13           Let's start with the first one. This is an  
14 analysis from 2015. We are about to finish analysis  
15 for 2016 models now. With incentives, BEVs are, the  
16 total cost of owning a BEV in its lifetime is about  
17 25 percent cheaper than in an average midsize  
18 gasoline case.

19           The economics were not as favorable with  
20 incentives for PHEVs compared to similar medium  
21 sedans, mid-size sedans running on gasoline. As soon  
22 as we take away the incentives the numbers change  
23 significantly.

24           And I show this to, you know, make sure to  
25 send a very clear message that these incentives are

1 still necessary for plug-ins to be competitive  
2 against comparable internal combustion engine  
3 vehicles. On the side of technology, on the side of  
4 battery, one of the largest drivers of the cost of an  
5 electric vehicle with a plug is the cost of  
6 manufacturing the battery pack.

7           We've been tracking battery prices, the  
8 whole pack, following two different methodologies,  
9 one via surveys and one being a bottom up analysis  
10 looking into the energy-generating components that go  
11 into the manufacturing of the sale.

12           Here, I'm showing you the results up to the  
13 second half of 2015 of our survey, approached. What  
14 is interesting here is, one, the reduction in the  
15 range of data that we got from the companies that we  
16 historically -- you know -- Sign an NDA said they  
17 will give us a view on what they were selling their  
18 packs for.

19           And the second one is that there's a  
20 significant reduction in the prices that they have  
21 been quoting us. We then use that data to build a  
22 learning curve, learning rates. I'm showing you here  
23 two different learning rates.

24           One is for -- no, to show -- just to set the  
25 stage, which is the one with you see with a leaner

1 feed on blue. That's what we've been tracking since  
2 2004 for the price of pre-selling silicon PV modules  
3 since 2004.

4 In 2016 we've seen an average learning rate  
5 or a slope of that leaner feed of about 25 percent.  
6 We started doing the same for the cost -- for the  
7 price; I'm sorry -- of the pack, of every pack that  
8 goes into an electric vehicle.

9 We began doing that in 2010. I showed you  
10 data in the previous slide starting 2012 because of  
11 the huge deviations we had on the data before 2012.  
12 But with the updated data from the survey that we  
13 carried out at the end of last year, that I will show  
14 you the results in a minute, we are now at our  
15 learning rate of close to 20 percent.

16 This is extremely interesting because we are  
17 achieving very steep reductions in those prices in a  
18 very short time. This is a result of the latest  
19 survey that allow us to form that 19 percent learning  
20 rate for the whole pack.

21 The weighted average price that was quoted  
22 by our participants was of \$273 per kilowatt hour.  
23 That compares to our previous price of \$350 per  
24 kilowatt hour in 2015. So almost that \$100 reduction  
25 in about a year in the price of a battery pack.

1           I don't think there are many industries that  
2 can show this -- you know -- drops of such steepness  
3 in their costs. We then take that learning rate that  
4 I showed you before that we built and we apply it to  
5 forecast, you know, assuming that prices continue to  
6 fall at 19 percent on average.

7           Where will they be by 2030, and we get to  
8 roughly \$73 per kilowatt hour by 2030, or a half a  
9 mid-point in 2025, which is another landmark from a  
10 policymaking perspective of about \$110 per kilowatt  
11 hour.

12           The second approach we have for looking at  
13 this big component of the cost of the EV, which is  
14 the batteries, to do a bottom up analysis where we  
15 look at most of the energy-generating materials that  
16 go into the manufacturing of the sale.

17           And then we look at the materials that go  
18 into the manufacturing of the pack, and then we make  
19 some financial assumptions of how much it costs to  
20 build the facility to make these packs and, you know,  
21 configure [sic] them for sale.

22           We've done it twice so far. This is a much  
23 newer analysis. We started in 2015 and we found a  
24 cost per kilowatt hour of about \$385, which is not  
25 too different from what we had surveyed of \$350 per

1 kilowatt hour, just a little bit higher.

2           And the iteration we carried out last year  
3 also saw a significant decrease in the cost, taking  
4 it down to \$223 per kilowatt hour. Here, you can see  
5 how the two methodologies compare, and then what  
6 we've done is we -- I didn't bring -- I didn't want  
7 to show you the -- I didn't bring the financial model  
8 that we used to forecast the bottom up analysis, but  
9 the message that I want to send is that following  
10 these two methodologies we get for 2030 in a range  
11 between 70 and \$90 for kilowatt hour for the whole  
12 pack.

13           So it's kind of refreshing to see that  
14 following two different methodologies you can get to  
15 a similar range within such a long time period. What  
16 this means is that from a total cost of ownership  
17 point of view, parity, basically, you know, when  
18 economic parity of buying a plug-in versus buying an  
19 equivalent vehicle that runs on gasoline, it's  
20 reached between 2020 and 2030, depending on the size  
21 of the pack.

22           Using those what we call inflection points  
23 we've built basically a consumer based demand  
24 forecast. It's a mass diffusion model that we've  
25 developed using methodology that goes behind this

1 type of S-curved based forecasts.

2           And as you can see from the blue line that  
3 shows the penetration of EVs on new sales on that  
4 year-to-year basis, you can see that between 2020 and  
5 2025 the knee of that exponential curve starts to get  
6 steep, and that's when the market gets incredibly  
7 interesting.

8           One of the points that Noel wanted me to  
9 discuss was how does this look with other forecasts.  
10 We actually are significantly more bullish, for  
11 example, BP, that is talking about a six percent  
12 inclusion rate by 2035; more bullish than Exxon, that  
13 is talking at about an 11 percent penetration rate by  
14 2040.

15           OPEC is talking about 13 percent by 2040.  
16 And so just so you get a sense of how we are, we  
17 think that there's enough appetite for EVs, as we saw  
18 with launch of the Model 3 by Tesla, to think about  
19 it as a consumer -- you know -- consumer pool type of  
20 industry and not so much as a manufacturing pool type  
21 of industry.

22           So that's why you see some differences  
23 between what we say and what other organizations  
24 forecasting the industry say. The final driver that  
25 I wanted to show you is mobility, and that's huge

1 here in California, especially in cities in  
2 California, in big cities in California, and it's the  
3 case in San Francisco where I live.

4           And a way to set the scenario is just look  
5 at the amount of money that is going into companies  
6 that are developing new ways of using vehicles. What  
7 is interesting is that these schemes are most of them  
8 agnostic to what the energy source for driving the  
9 vehicle is, but we do think that there's a very  
10 interesting, you know, connection between high  
11 utilization -- between increasing by utilization of a  
12 vehicle from a total cost of ownership, and increased  
13 use of electric vehicles.

14           And to do so we basically took the total  
15 cost of ownership lines that I showed you before,  
16 this is the exact same I showed you before with those  
17 inflection points where parity on a TCO is based  
18 between 2020 and 2030, and we just doubled the  
19 electric miles traveled to 20,000 miles per year, and  
20 you start seeing those inflection points happening  
21 significantly sooner.

22           That means that schemes that result in  
23 higher utilization of vehicles tend to favor electric  
24 vehicles from a total cost of ownership point of  
25 view. What that means, if we're reversing and

1 nearing our mass diffusion and we start with this  
2 cost parity significantly sooner, at around 2018, we  
3 get a much higher adoption in the next 10 years, in  
4 the next 15 years.

5 In the U.S. only by 2030 we see roughly  
6 three more -- 3 million more plug-ins sold just as a  
7 result of using plug-ins more, of driving plug-ins  
8 more. And this is not completely out of the picture  
9 because I'm sure that a lot of you know that most  
10 vehicles are used roughly for about five percent of  
11 their usable time.

12 So assuming that, you know, somebody that  
13 has additional time, which is, you know, the case of  
14 some drivers on ride-hailing companies that, you  
15 know, already have the vehicle and they're simply  
16 using the vehicle more, that utilization will tend to  
17 favor the economics if it's an electric vehicle.

18 I want to leave it there and give the chance  
19 to the other analyst to show his results. Thank you.

20 COMMISSIONER PETERMAN: I have a question or  
21 two. As always, an informative jam-packed  
22 presentation, but a couple of follow-up questions.  
23 One on slide 16 you show EV sales penetrations for  
24 future years. What's it for the U.S. in 2030?

25 MR. ZAMORANO: For the U.S. in 2030, I don't



1 have that number with me, but I can get it for you.

2 COMMISSIONER PETERMAN: That would be great  
3 if you could provide that, as well, if you happen to  
4 have it broken down for California.

5 MR. ZAMORANO: We do, yeah.

6 COMMISSIONER PETERMAN: Okay. I'd like both  
7 of those.

8 MR. ZAMORANO: Um-hum.

9 COMMISSIONER PETERMAN: And then I have a  
10 question or two related to the battery pack projected  
11 cost or just the current cost. And what I'm trying  
12 to understand here is what's the connection  
13 potentially between our EV deployment programs and  
14 increasing that local demand for EVs, and the  
15 production of the battery packs in the U.S.

16 And so as I saw that you're showing that  
17 U.S. plants at high volume can produce battery packs  
18 at a cheaper cost than average. I think it was like  
19 slide nine or so. Let's see. I think it was one  
20 more slide up.

21 Well, I mean, this is fine, but just in  
22 terms of how the batteries are disbursed or what that  
23 supply chain is. So is the market designed where you  
24 would site your battery plant closest to where the  
25 demand is?

1           Are location, travel costs prohibitive, or  
2 would we expect to get battery packs from China, for  
3 example, for the California market?

4           MR. ZAMORANO: Yeah. So if you look at  
5 where most lithium batteries are produced today. I'm  
6 not thinking about what has been developed in, at  
7 least in Nevada here in the states. The vast  
8 majority of the capacity is in South Korea and Japan.

9           Yet, we use electronics, computers, laptops,  
10 you know, cell phones that are using those batteries  
11 that come from those facilities across the world.  
12 Granted that most of those batteries are manufactured  
13 in countries nearby.

14           So there's a point to potentially the cost  
15 of shipping the battery, but we haven't seen any  
16 evidence yet that is, you know, other than what's  
17 happening here in the states with -- particularly  
18 with making a factory, we haven't seen any evidence  
19 of other automakers shifting that manufacturing just  
20 because they want to be closer to where the market  
21 is.

22           COMMISSIONER PETERMAN: So this price point  
23 that large U.S. plants, you know, bigger than three  
24 gigawatt hours --

25           MR. ZAMORANO: Yeah.

1           COMMISSIONER PETERMAN:  -- could bring the  
2 average price lower.

3           MR. ZAMORANO:  Yeah.

4           COMMISSIONER PETERMAN:  That's based on just  
5 the Nevada plant?

6           MR. ZAMORANO:  That's based, we spoke to --  
7 we didn't speak to the Nevada plant in that  
8 particular case.  We spoke to manufacturers in other  
9 parts of the world, but not to the Nevada plant.

10          COMMISSIONER PETERMAN:  Okay.

11          MR. ZAMORANO:  Yeah.  In fact, I actually do  
12 have the rate for 2030.  It's 20 percent in the U.S.,  
13 assuming equal utilization of vehicles, and increases  
14 to 23.75, assuming the full utilization of plug-ins.

15          COMMISSIONER PETERMAN:  Thank you.  And then  
16 just one more thing about the battery pricing.  Is  
17 there a wide distribution in prices for battery  
18 packs?

19          MR. ZAMORANO:  Yeah.  We have a whole series  
20 of analysis on that and it's basically -- our theory  
21 is that there's a push for battery makers to develop  
22 what we refer to as symbiotic relationships with  
23 automakers.

24                   And in that push to basically secure that  
25 the launch of a new line is using their packs, they

1 are undercutting a little bit their prices.

2 COMMISSIONER PETERMAN: Thank you.

3 MR. ZAMORANO: Yeah.

4 CHAIRMAN WEISENMILLER: Yeah. I actually  
5 have a couple, so let me -- sorry. I think we're  
6 going to hold her, but after she jumps in I'll sort  
7 of end it, too. I'm focusing on the current sales  
8 numbers.

9 MR. ZAMORANO: Yeah.

10 CHAIRMAN WEISENMILLER: And so the first  
11 question is how solid are the Chinese numbers?

12 MR. ZAMORANO: How solid?

13 CHAIRMAN WEISENMILLER: Yeah.

14 MR. ZAMORANO: As solid as our sources.  
15 Yeah. There's an issue with, I think it began in --  
16 she was at the end of 2015 where there were some  
17 fraudulent sales. Basically, manufacturers were  
18 getting the subsidy with the VIN number, but the car  
19 wasn't even -- you know -- the packs were never  
20 actually installed.

21 The government found some companies I guess  
22 guilty of doing that and they were -- you know --  
23 they were fined, is my understanding, for doing so.  
24 So we did adjust our numbers to whatever the media,  
25 you know, that came out from that reported.

1           But there's an issue with that, with  
2 fraudulent VINs, and there's also an issue with what  
3 they defined as a NEV, as a new energy vehicle, which  
4 is what we defined as an electric vehicle here on the  
5 western world.

6           So we do have, we do find it tricky  
7 sometimes to shave some of the data that comes out,  
8 especially for low-speed vehicles, that we don't want  
9 necessarily to count because they're not compatible  
10 to models that are sold here in the U.S. or in Europe  
11 or the rest of Asia.

12           So I will say our numbers for China, the  
13 historical numbers, are as good as the data that is  
14 available, but the data that is available sometimes  
15 is not 100 percent accurate.

16           CHAIRMAN WEISENMILLER: Do you have a sense  
17 of what your correction is to the Chinese numbers?

18           MR. ZAMORANO: I can find out. I remember  
19 my Chinese colleague was the one who pulled those out  
20 when the modification was made, but that's an easy  
21 number for us to find, yeah.

22           CHAIRMAN WEISENMILLER: Okay. That'd be  
23 great. Other question was, it's probably been a  
24 couple years ago, but there was a chart from GM that  
25 showed U.S. auto sales coming back up, but basically

1 plug-in and electric staying more or less flat.

2           Is that -- you know -- at this point at  
3 least is the percentage of, you know, zero emission  
4 vehicles in the U.S. tracking the fleet, or is it  
5 still more constant?

6           MR. ZAMORANO: So we did that analysis last  
7 year where we wanted to find if electric vehicle  
8 sales in the U.S. and in Europe, in the two regions,  
9 correlated more to changes in oil prices that -- or  
10 if they correlated stronger, more -- you know -- more  
11 strongly to changes in sales of vehicles.

12           So basically, do EVs follow car markets or  
13 do EVs follow fuel markets. And we actually found a  
14 higher correlation with car markets than with fuel  
15 markets. And so -- which was a little bit  
16 surprising.

17           Of course, as you start hybridizing that  
18 vehicle, as it -- you know -- the closer you get to a  
19 HEV, then that correlation between EVs and car  
20 markets decreases and the correlation between the HEV  
21 and fuel prices increases.

22           But with BEVs there are much more higher  
23 correlated to car markets. And the other thing we  
24 found was that there's a strong driver of sales of  
25 BEVs and that is new model launched. And we did that

1 analysis also for the places where we saw -- you know  
2 -- some countries in Europe we saw an increasing  
3 number of, you know, pretty steep growth in the sales  
4 of EVs.

5           And we looked at how many new models were  
6 being offered in the last year or two years where we  
7 started seeing that increase, and we found that  
8 there's an interesting correlation there, but it's  
9 not strong enough for us to say there's a definite  
10 correlation, but it does have a positive impact in  
11 sales when new models are launched.

12           CHAIRMAN WEISENMILLER: The other thing we  
13 struggle with on a charger location is where to  
14 locate them. And historically, we've -- I don't,  
15 again, I'm not sure how granular your forecasts get,  
16 but historically we have assumed that areas which  
17 have been innovative in car purchases historically  
18 are the ones which will be more inclined to take up  
19 zero emission vehicles or BEVs.

20           Do you have any sense whether that's a good  
21 or bad assumption?

22           MR. ZAMORANO: I think it's a fair  
23 assumption, yeah.

24           CHAIRMAN WEISENMILLER: Okay.

25           MR. ZAMORANO: Yeah. There's an interesting

1 shift that we've seen, and it is as a result of what  
2 we -- I spoke very briefly on mobility, and it is on  
3 how, you know, if we are assuming that utilization is  
4 favorable for the -- higher utilization of the  
5 vehicle is favorable for the economics of own an  
6 electric vehicle, and we've seen new technologies  
7 that have enabled higher utilization of vehicles,  
8 either by sharing or hailing them, those vehicles to  
9 be electric are probably going to have very different  
10 requirements in terms of location and speed of those  
11 chargers, because the premise is different.

12           In this case those vehicles are going to be  
13 charged while used, similar to a gasoline car, not  
14 charge while parked in home, in a mall or at work.  
15 So that's something that we've been struggling to  
16 understand on, you know, how much does it change the  
17 thinking behind where those chargers need to be  
18 installed if we are starting from the premise that  
19 those vehicles are going to be used heavily in  
20 sharing or hailing schemes.

21           CHAIRMAN WEISENMILLER: And do you do  
22 forecasts of fuel cell vehicles?

23           MR. ZAMORANO: We are going to publish our  
24 new version in April -- oh, I guess it's probably  
25 out. If it's not out now it's going to be out in



1 May. So we have a big event next week in New York,  
2 and that's where our CEO is going to show those  
3 results.

4 CHAIRMAN WEISENMILLER: Great.

5 MR. ZAMORANO: Yes.

6 COMMISSIONER PETERMAN: Commissioner Scott,  
7 I have one more followup question. You know in terms  
8 of EV sales, trends, that policy support in China and  
9 Europe have been big drivers of the forecasts looking  
10 up in those regions. Can you just highlight what  
11 have been the most important policies in those  
12 regions?

13 MR. ZAMORANO: I'm always -- I tend to  
14 answer that question with, you know, direct  
15 purchasing incentives as probably the strongest  
16 driver, but I don't know the Chinese mechanisms well  
17 enough to say so.

18 But in Europe I would say that purchase  
19 incentives are probably one of the strongest drivers,  
20 especially up to now when the TCO of a BEV without  
21 subsidies in pretty much most markets is higher than  
22 the TCO of an ICE.

23 COMMISSIONER PETERMAN: And I was wondering  
24 if you've heard of or seen any interesting new  
25 financing models for the vehicles beyond the support

1 of the direct incentives? I'm trying to think  
2 through a bit.

3 We've seen financing innovations in solar PV  
4 that have really helped to revolutionize the market,  
5 and it's not clear to me what the equivalent would be  
6 in EVs, but if you've seen anything elsewhere, I  
7 would love to know about it.

8 MR. ZAMORANO: We been looking at leases  
9 closely, mostly as a result of all the noise behind  
10 car company results in the last earnings season on,  
11 you know, how those inventories might be stocking up  
12 a little bit.

13 And definitely, there's a trend. You know,  
14 EVs are following pretty much the same trend as other  
15 vehicles in terms of being leased more than being  
16 purchased. New ways to finance them? We haven't  
17 really looked closely into that. Yeah.

18 COMMISSIONER SCOTT: I had a question for  
19 you on slides eight and nine, which is where you  
20 showed kind of the total cost of ownership with  
21 incentives, versus the total cost of ownership  
22 without incentives.

23 When you get from -- or have you guys looked  
24 at, once you get from the price that we're at now,  
25 which was about 273, I think, dollars per kilowatt

1 hour, into that I think it was 70 to 90 range, what  
2 does that look like in the total cost of ownership?

3 Or is it because the batteries cost less you  
4 can increase the range and sort of -- that sort of  
5 counterbalances the gain, any of the benefits you may  
6 gain there in terms of cost?

7 MR. ZAMORANO: So basically, you start  
8 seeing those inflection points, those intersections  
9 happening significantly sooner. So for example, this  
10 is based on our current battery price forecast. So  
11 the reduction in those falling curves that I showed  
12 you with the 19 percent learning rate are reflected  
13 here in that reduction on the TCO of the plug-in.  
14 Yeah. All right. Thank you.

15 MR. OLSON: Thank you, Alejandro. So our  
16 next speaker is Derek Jones with Navigant Energy  
17 Practice.

18 MR. JONES: Thank you, Tim, and good  
19 morning, everyone, Commissioners, Commission Staff  
20 and fellow Workshop participants. Thanks for the  
21 opportunity to come here today and to add onto what  
22 Alejandro shared with us all, as far as the global  
23 forecast and getting into the numbers.

24 So as Tim mentioned, with Navigant's Energy  
25 practice. We're a global research and consulting

1 firm. Our syndicated research service covers the  
2 types of global, as well as U.S. and regional  
3 forecasts, as Alejandro described, I'll cover just at  
4 a high level.

5 From the consulting side what I was looking  
6 to cover in particular today was what type of  
7 consideration that POU's should think about as they  
8 look towards these IRP forecasts going forward. So  
9 that comes from my background with 10 years in the  
10 DER space, having worked previously with PG&E on EV  
11 forecasts, as well as the other IOUs in terms of  
12 adoption and upgrade costs in my former life, and  
13 prior to that working with Mitsubishi Corporation,  
14 advising executives around the world on the U.S. and  
15 global market.

16 So just to speak to my colleagues on the  
17 research side, we have our Transportation  
18 Efficiencies Research Service. They cover the topics  
19 up on the board there, with PEVs, battery electrics,  
20 hybrid. We'll speak to some of those acronyms as we  
21 start to run through the presentation, although we  
22 cover the other aspects of mobility, as well.

23 So from those forecasts and really through  
24 our supply chain engagement, both on the government,  
25 but as well, as what we think about the market

1 ecosystem conversations through the supply chain,  
2 whether it's OEMs, whether it's the service  
3 providers, whether it's charger equipment providers,  
4 or those that play in the various spaces through our  
5 little Venn diagram there.

6           That's where our analysts source that  
7 information and feed it into their forecasts. I  
8 engage them on the consulting end, closer to the  
9 market and to our clients. So with that in mind,  
10 Noel provided some of the questions that Alejandro  
11 mentioned, and I'm going to walk through them here.

12           Provided a fair amount of detail in the  
13 deck, just for the sake of the docket, having  
14 presented in these type of workshops before in my  
15 former life, but at least speaking to it, I'll look  
16 to move fairly quickly and keep it high level. So  
17 see if I can strike that balance.

18           First, then, expectations for the prevalence  
19 of PEVs. By 2030 we see at least in our base  
20 forecasts, and that includes the plug-in hybrid and  
21 the battery only, at 12.5 percent of global, light  
22 duty markets with a vehicle population that equates  
23 to roughly five percent or over 65 million vehicles.

24           Similar trends that we heard from Alejandro  
25 in terms of battery prices looking to decline faster

1 over time, as well as large uptake in the Asian  
2 markets really leading the way globally. But again,  
3 kind of back from that POU perspective, what can we  
4 look at down the road as we're looking indeed to  
5 2030.

6           We see autonomous vehicle uptake,  
7 particularly beginning in the early 2020s, as a  
8 really kind of a monkeywrench in terms of forecasting  
9 and modeling today, because there is a significant  
10 advantage from the power train perspective with the  
11 electric vehicles, in that you have all electric  
12 components, reduced maintenance costs, wireless  
13 recharge.

14           That has a very compelling business  
15 proposition to that specific market if we're thinking  
16 about autonomous driving. And if it's in the ride-  
17 hailing or the car-sharing markets those issues  
18 really haven't played out and we're only at really  
19 the cusp of understanding what those are going to be.

20           So given those 2030 forecasts, there's a  
21 fast evolving market and a lot to observe as we go  
22 forward. So tracking that is key and certainly  
23 something that we advise our clients do. And you  
24 know, really, on the back of that is the 200-mile  
25 range barrier eclipsing in 20 -- or heading up to

1 2020 with the auto manufacturers here listed really  
2 moving that needle in terms of range anxiety, as I  
3 know folks in the room are familiar with today.

4           So with that, you know, how do our forecasts  
5 typically compare to what we see in the rest of the  
6 industry? Sixty-five million globally; could be  
7 perceived more on the conservative side, but really,  
8 in terms of 12.5 percent of the market is really more  
9 aggressive than what we've seen in other industry  
10 forecasts.

11           We do tend to be a little more conservative  
12 in the EIA, the Energy Information Administration,  
13 but relative to the other industry we're typically  
14 more conservative, and so you see that slightly more  
15 aggressive piece of the forecast flowing from that  
16 uncertainty.

17           Again, we're on the cusp of seeing some of  
18 these new models or new markets uptake this  
19 technology. So by 2030, again, ride-sharing, ride-  
20 hailing is really going to affect ownership rates and  
21 create variations in forecasts.

22           So you know, for a few of you colleagues  
23 that's certainly something to keep in mind since  
24 these are, you know, very tailored and specific  
25 markets with specific customer bases that may or may

1 not have a high prevalence of these markets.

2           So what then are the factors that are  
3 driving PEV forecasts? Certainly, the total cost of  
4 ownership model. Battery prices, as we heard from  
5 Alejandro, and government subsidies certainly.  
6 Comparison is a function of oil prices.

7           You know, generally our model isn't going to  
8 -- doesn't deviate from much else of what we see in  
9 the market. But two other things that we talk about  
10 and in particular, customer sacrifice, something that  
11 we're engaging in the market and starting to engage  
12 with our clients as we try to work through these  
13 customer problems, whether it's IOUs or POUs.

14           The capability of the range relative to ICEs  
15 is certainly something that isn't new, but the  
16 convenience of the charging stations is a piece in  
17 terms of our modeling that is iterative. So within  
18 infrastructure where the charging stations exist, you  
19 see the prevalence and the adoption and then there's  
20 a feedback loop in terms of where the next station  
21 might be located, the commensurate adoption and flow  
22 from there.

23           But along from the tradeoffs and the  
24 consumer sacrifice we also see model availability as  
25 a key driver, and certainly, as we've looked out



1 across the country with California upwards of 24  
2 models available in the market.

3 Areas in the south that have in some cases  
4 zero models, and PEVs or plug-in hybrids as we look  
5 out across our forecasts and we talk with our market  
6 actors there, and in talking with OEMs in particular  
7 the model rollout is a challenge.

8 Chicken before the egg in terms of demand,  
9 and from a dealer's perspective that can be a large  
10 hurdle where hard to stock inventory, that you're not  
11 fully convinced that the market's going to uptake  
12 when you're talking about stocking a vehicle as  
13 opposed to stocking a smart thermostat, right, in  
14 comparison to the EV market.

15 So certainly, something again just in using  
16 the national landscape for POUs in California to  
17 think about, since we have such a diverse stakeholder  
18 and consumer group here to think about. So model  
19 availability being certainly key.

20 But despite those challenges we certainly  
21 see across the OEMs, some really landmarks in terms  
22 of rolling out new models for customers with Chrysler  
23 having the first minivan hitting the market and  
24 Mitsubishi with a four-wheel drive SUV to complement  
25 some others in the market.

1           Certainly, the model availability and the  
2 availability of it to new consumer groups that  
3 wouldn't otherwise consider electric vehicles is --  
4 does get at that barrier and is certainly something  
5 to keep in mind for upcoming forecasts at a granular  
6 level.

7           But you know, over time what is going to  
8 drive consumer demands, you know, with vehicles, with  
9 cars being part of the fabric of America, it's going  
10 to be those same core market drivers as today in  
11 terms of customer options versus their personal  
12 priorities.

13           And you know, for us it's certainly complex  
14 and challenging to simplify or to try to delve into  
15 those deep levels of what that future's going to look  
16 like from a personal priority perspective due to the  
17 evolving nature, as we talked about, with these new  
18 markets opening up.

19           But I would stress those other markets of  
20 autonomous driving, the ride-sharing and the ride-  
21 hailing as key pieces to keep track of going forward.  
22 So pivoting over to the infrastructure side, you  
23 know, what are some ideas in terms of stimulating  
24 private investment to consider as if you're a POU and  
25 you're thinking about these issues.

1           As I mentioned, the way we think about it in  
2 terms of a modeling perspective is a feedback loop  
3 iterating over population growth, commensurate  
4 infrastructure option followed by then more growth.  
5 But you know, what does that mean long term?

6           And the way we account for that is  
7 diminishing costs similar to the battery cost  
8 reductions of infrastructure installation. So if  
9 that is a key mechanism and the feedback loop can  
10 only grow more aggressively, recognizing that up-  
11 front cost, what are some recommendations or policies  
12 to think about.

13           Certainly, installation or equipment  
14 subsidization are out there; make-ready building  
15 codes, already broken ground here on that front in  
16 California, but certainly, more to be done as we  
17 start to think about really key markets like  
18 workplace charging where we see eight times more  
19 likelihood of workplace employees to uptake a PEV  
20 when they have that charging available.

21           So that's certainly something that we focus  
22 on and have been communicating across our national  
23 host of clients. But certainly, streamlining,  
24 permitting and processing, a familiar issue from the  
25 solar days in terms of making that a streamlined

1 process, as well.

2           So some infrastructure considerations to  
3 think about, and certainly, with 350 plus charging in  
4 the works, and new ideas from -- at least in talking  
5 to utility clients across the country about how to do  
6 that, certainly, there are challenges from a rate-  
7 making perspective in how do you roll in the costs of  
8 new infrastructure into volumetric rates.

9           And there have been some interesting ideas  
10 to share, particularly around leveraging DC directly  
11 from a substation for fast-charging corridors, and  
12 then in that case being able to roll those costs for  
13 that specific infrastructure into particular rates  
14 for those customers.

15           So there are some interesting ideas out  
16 there and efficiencies that are looking to be gained,  
17 which is a great sign from the market without really  
18 any major, you know, national regulation in that  
19 space. So more ahead on that front.

20           But in terms of these inherent uncertainties  
21 that we've been talking about, you know, how do those  
22 affect the outlook for deployment. So in terms of  
23 model availability we do see in the near term a  
24 significant impact, again, across our forecast.

25           We do think long term that the global

1 efficiency standards, so not just CAFÉ, but that  
2 global pressure for the global automakers is going to  
3 continue to weigh on those decisions, based on our  
4 conversations.

5           Certainly, recent changes in the U.S. market  
6 for CAFE will have an impact, but long-term at the  
7 global scale for these global automakers we do see  
8 that impact being diminished over time. Again, going  
9 back to the automated ride-sharing, we do see a  
10 minimal impact because the convenience at the moment  
11 of internal combustion engines for high vehicle  
12 utilization is critical to their ability to deliver  
13 fast services to their customers on demand.

14           But we do see it as a key opportunity for,  
15 again, the economies of the power train for an  
16 electric, all electric component vehicle with greater  
17 reliability, lower maintenance cost, similar to the  
18 infrastructure on the DC/FC side.

19           As a big up front investment those economies  
20 over time I think will prove their business value  
21 proposition and receive due consideration. So that's  
22 at least in our perspective some key market outlook  
23 things to keep in mind.

24           COMMISSIONER PETERMAN: Excuse me, just one  
25 question. What do you consider long term or short

1 term?

2 MR. JONES: We do see, again, with 2020  
3 being a large uptake in terms of -- or at least the  
4 initiation of uptake of autonomous, all these  
5 recommendations are with 2030 in mind.

6 COMMISSIONER PETERMAN: Okay.

7 MR. JONES: So I think by 2030 that's where  
8 we start to see that opportunity having some legs.  
9 And so I'll finish off just with the California's  
10 decarbonization goals and, you know, question being,  
11 are market conditions and forces sufficiently  
12 established in California.

13 I'm continually reminded when talking to  
14 clients across the country, well, remember, we're not  
15 California. So not all conditions are the same. So  
16 certainly, California is a well-established leader  
17 and the organic development is there, has taken hold.

18 So in terms of are the market conditions  
19 sufficient, you know, we see it in a more or less  
20 standpoint, and of course, it is a bit of a wait and  
21 see. But with subsidies in place, the organic  
22 development, certainly, the customer attitudes that  
23 are much more driven by identification with  
24 environmental and the greenhouse gas goals of the  
25 state, we see it as maintaining at the very least,

1 status quo.

2           But again, model availability when we're  
3 thinking about key considerations for POUs, what do  
4 dealers have in stock across the country. Fresno,  
5 where I'm from, you know, really, are dealers  
6 stocking those cars to be able to change those  
7 customer attitudes and do the types of ride and drive  
8 events that really start to -- getting back to my  
9 comment about the changing the fabric of the American  
10 driving experience, there is kind of a lightbulb that  
11 goes off when you drive your first hybrid electric or  
12 your first all battery, in particular, that this is  
13 something I can rely on day in and day out, take my  
14 kids to school, get to work and be a "plug and play"  
15 part of a customer's life.

16           So again, for that local POU perspective  
17 those are key considerations that we recommend  
18 keeping in mind. Do dealers have them? How are they  
19 working with the utility in terms of taking  
20 recommendations on rates or any other type of  
21 programs, putting that in the customer's hands and  
22 having that part of the consumer education process,  
23 those are all key considerations at a local level  
24 that we see driving consumer awareness and education,  
25 and certainly, that's been a larger part at the state

1 level and with the IOUs so far.

2           With the ZEV program components, certainly,  
3 monitoring and tracking them over time to deal with  
4 these uncertainties that I mentioned earlier is going  
5 to be important, agile and attentive, certainly in  
6 this docket and across proceedings.

7           There is a lot of attention, so I don't have  
8 a lot of fear about the careful attention to the  
9 changes over time, but making informed decisions will  
10 be important. So then lastly, private and public  
11 intervention.

12           Just some ideas to share, but we can talk a  
13 little bit more during the question and answer  
14 section, but additional approaches. So I mentioned  
15 workplace, and specifically, workplace subsidization  
16 with DOE looking to fall back on their program on the  
17 workplace side.

18           Certainly, a place to step in and alongside  
19 and along with manufacturers, you know, conversations  
20 with OEMs. There's certainly a willingness to share  
21 data and to make that available across the country.  
22 I think a challenge or a trick you run in there with  
23 is points of contact for them are challenging to have  
24 at each commission, understanding each regulatory  
25 environment.



1           There's certainly a willingness, but there's  
2 not a commensurate number of regulatory folks across  
3 all the OEMs to be able to deliver the data in this  
4 specific way. So being able to plan for  
5 infrastructure I think is important on those types of  
6 conversations.

7           It can benefit California's goals, as well  
8 as grid stability. But you know, at a city level  
9 programs for low emissions zones are ideas that we've  
10 seen floated around, mandates for those automated  
11 driving systems; so as we're thinking about those  
12 coming online, what types of mandates for those  
13 systems post the R&D phase, after all those items are  
14 understood.

15           Subsidizing car-sharing programs with used  
16 PEVs, certainly, the secondary market is an  
17 opportunity for a second life for those cars, and  
18 again, with ride-hailing fleets, subsidizing and  
19 encouraging those to benefit the air quality and  
20 decarbonization goals.

21           So just a handful of things to consider and  
22 chat about, but I'll leave that for the Q and A  
23 session. So thank you very much.

24           CHAIRMAN WEISENMILLER: A couple questions.  
25 Do you do fuel cell forecasts?

1           MR. JONES: We do fuel cell forecasts. I do  
2 not have those numbers on me, unfortunately, but  
3 certainly could follow-up.

4           CHAIRMAN WEISENMILLER: Yeah. If you could  
5 submit those for the record, that'd be great. Also,  
6 I was really interested about your building in a  
7 feedback loop for charging stations, and again, was  
8 trying to understand some of the correlations there,  
9 and obviously, the question of charging stations in  
10 the sense of workplace, you know, as we sort of  
11 struggle through the proverbial questions, where best  
12 to put those, trying to understand at least how  
13 you've built that in, and the basis for that feedback  
14 analysis.

15           MR. JONES: Well, certainly, on things like  
16 workplace that's handled more, tailored, you know,  
17 locational basis. So in our global forecasts there  
18 aren't those assumptions around workplace in  
19 particular, but infrastructure in general as a  
20 function of PEV adoption, recognizing that  
21 infrastructure would be available or at least  
22 targeted for those areas.

23           But when we think about specific siting and  
24 when we work with clients on that, it's very much  
25 corridor driven, VMT, and proximity of major

1 causeways, thruways and so on. So those -- that  
2 level of granularity, we typically do in a one-off,  
3 *ad hoc* fashion.

4 CHAIRMAN WEISENMILLER: And do you  
5 distinguish -- well, obviously, one of the messages  
6 is that fleet vehicles generally should be more  
7 attractive, but trying to understand the nature of  
8 the forecast.

9 Obviously, I think all of us were, sort of  
10 when China started talking about requiring all taxis  
11 in Beijing and Shanghai to be electric, certainly,  
12 that was a signal to the world about really trying to  
13 move the needle here, and again, trying to understand  
14 in terms of what the economics are in that area, or  
15 again, how to -- what the forecast is for fleets as  
16 opposed to personal vehicles and how -- what the  
17 policies we might have in those areas.

18 MR. JONES: Well, I did mention in one of my  
19 recommendations that sort of ride-sharing fleets is  
20 an example of fleets as an opportunity, just be -- it  
21 is their function I think of the business  
22 proposition.

23 And we mention that taxis having their own  
24 value proposition and own regulated requirements as  
25 opposed to something like a ride-share is a little

1 more advantageous, since it is a little more business  
2 value-drive.

3           So to be specific in terms of on demand  
4 delivery and cost of ownership, being driven by the  
5 owners themselves in ride-sharing, that being more of  
6 a personal one-off decision, as opposed to a full  
7 company putting out that up front cost.

8           So as a function of that being part of the  
9 overall forecast over time, I mentioned it's an  
10 uncertainty, but certainly happy to delve in deeper  
11 with my analysts to see if there's something in more  
12 depth that we can provide. Great. Thank you.

13           MR. OLSON: Okay. Commissioners, I have a  
14 couple more questions and could we migrate to the  
15 table here and finish our discussion for --

16           (Pause

17           MR. OLSON: Thank you, gentlemen, for the  
18 great presentations. One of the things, this  
19 Workshop is about publicly owned utilities and their  
20 efforts to plan for electric transportation in their  
21 IRP process, and I wondered if you could comment on  
22 how your services, your capabilities can be of value  
23 to the publicly owned utilities.

24           Some of them are very small. Some of them  
25 are large, and maybe kind of look at things like what

1 databases do you use to track EV adoption and what  
2 sources of data might be helpful to use your  
3 analytical tools to then benefit the POU's, and  
4 looking at it as kind of a facilitated effort to  
5 provide that support.

6 MR. ZAMORANO: I think that the biggest  
7 value we provide is that we do the same in pretty  
8 much every country. So we can give a perspective of  
9 what has worked in other places and what hasn't  
10 worked in other places.

11 Sometimes, you know, when you think that  
12 what you're doing is the first time anybody has done  
13 it, chances are that somebody has tried it somewhere  
14 else. So you know, some of our clients see a lot of  
15 value in that.

16 In the particular case of my firm there's  
17 now clear connection between what's happening in the  
18 renewable energy story with what's happening in what  
19 we call the advanced transport story, with the  
20 storage with the battery being that missing link that  
21 gets -- brings them together.

22 So there is some value in companies that are  
23 fully exposed to energy markets that are sometimes,  
24 you know, maybe not too exposed through renewable  
25 energy markets, but with the potential of

1 increasingly getting exposed through renewable energy  
2 markets, one need also to understand what could  
3 happen on the transportation side from a storage  
4 point of view. So I think those are the two key  
5 pieces that we offer them.

6 MR. OLSON: And Derek, you have a --

7 MR. JONES: Sure. And so thinking about  
8 data sources, you know, certainly it has been a  
9 challenge over time in terms of projections due to  
10 the, you know, protective nature of vehicle adoption,  
11 of registrations. So that's certainly a cost to our  
12 public utility colleagues to absorb.

13 But there is -- it is a robust supply chain.  
14 So in terms of leveraging what's public versus what  
15 is going to be private, I think there will need to be  
16 a reliance on folks who are plugged into that, pun  
17 intended, supply chain to be able to understand where  
18 things are moving.

19 As I mentioned, one challenge again is  
20 understanding where OEMs are going with their roll-  
21 outs, what types of models they're rolling out. They  
22 don't have the public facing or rather the market  
23 facing Staff to be able to continue to provide that  
24 data.

25 We have seen a strong request from utilities

1 for that. So I think there is a key opportunity  
2 there and that's something that we've engaged both  
3 communities about, to be able to provide. So I think  
4 that is one key piece, a, that we're working on  
5 helping to facilitate, a connection between the OEMs  
6 and the state governments and commissions, and how  
7 that can be a little more turnkey going forward.

8 MR. OLSON: I want to just followup on,  
9 Commissioner Peterson raised a question earlier about  
10 business models related to financing, and wondered if  
11 in your observations of the electric vehicle industry  
12 growth what you're seeing as business models that  
13 might develop and be sustained regarding the private  
14 flow of capital for the electric vehicle charging, if  
15 you have a comment. And I think we have -- that's  
16 about it for our last question.

17 MR. ZAMORANO: I already addressed it. So I  
18 don't really have more.

19 MR. JONES: So in terms of financing models  
20 for private capital flow, you know, typically in  
21 these scenarios with POUs we've advised, you know,  
22 whether it is -- some of their more traditional  
23 avenues, like bond revenue or putting up city bonds  
24 through votes and partnering with cities, but also,  
25 private partner financing.

1           That sort of three P model I think is a  
2 potential. There is a certain degree of risk that's  
3 led to the hesitation up until now with the sunk  
4 costs of DCFC, for example, but I haven't seen that  
5 three P model explored in too much detail when  
6 thinking about infrastructure, and so that would  
7 certainly be an area to look at without any  
8 particular active planning.

9           MR. OLSON: Okay. Thank you very much. I  
10 think we're at the end point of our time slot here.  
11 Just one other. Hopefully, gentlemen, you're willing  
12 to provide some of your data, not only your  
13 PowerPoints, but some of your background information  
14 for our docket here. That would be very helpful if  
15 you're willing to do that. And back to you,  
16 Commissioners.

17           CHAIRMAN WEISENMILLER: Are there --

18           MS. RAITT: Okay. So I think we're ready to  
19 take a break, and we'll be back at 1:00 o'clock. And  
20 just a reminder, public comment at the end of the  
21 day. So if you wanted to make comments go ahead and  
22 fill out a blue card and give it to me, but we'll be  
23 back at 1:00.

24           (Off the record at 12:02 p.m.)

25           (On the record at 1:04 p.m.)



1           COMMISSIONER SCOTT: Just as a reminder, the  
2 blue cards look like this. They're on the table out  
3 front. So if you'd like to make a comment, please be  
4 sure to fill out one and hand it to Heather, as she  
5 just said, and that's how we'll know that you're  
6 wanting to make a comment when we get to that portion  
7 of our Workshop. Okay. Thanks. Go ahead Noel.

8           MS. RAITT: So we have a series of panels  
9 this afternoon. The first one is on Planning and  
10 Interconnecting Loads from High Power Charging, and  
11 Noel Crisostomo is going to be our moderator.

12           MR. CRISOSTOMO: Thanks, everyone. Welcome  
13 back from lunch. So our panel today is smaller than  
14 originally intended, but we were hoping to gather  
15 stakeholders who are leading the charge, pun  
16 intended, in getting our vehicles charged much  
17 faster.

18           Originally, we had in addition to Dave  
19 Packard from ChargePoint and Tom Ashley from  
20 Greenlots, Terry O'Day, from EVGo, and potentially,  
21 Wayne Killen, from Electrify America. Obviously, in  
22 the past several months we've seen very quick  
23 progression of technology, both models of electric  
24 vehicles being announced, but also chargers.

25           So I'll go over just a few of the really key

1 aspects of this technology evolution since December  
2 in setting the stage for Dave's presentation and then  
3 Tom's. So in December EVGo broke ground on the first  
4 350 kilowatt installation in Baker, which is on the  
5 way from Southern California to Las Vegas to enable  
6 those interstate trips at a rate seven times as fast  
7 as the existing EVGo fleet.

8           Just a few weeks later in January at the  
9 Consumer Electronics Show ChargePoint unveiled a  
10 liquid cooled connector capable of 400 KW charging.  
11 In February there's two important research events.  
12 Greenlots was awarded an Electric Program Investment  
13 Charge, grant funding opportunity for DC fast charge  
14 based vehicle grid integration to improve the  
15 economics of fast charging.

16           And EVGo unveiled in Fremont a 150 KW  
17 station intended to test the prototype vehicles that  
18 would accept higher rates of charge. In March,  
19 Electrify America, VW's subsidiary established under  
20 the settlement, set off a plan to set up a nationwide  
21 fast charging network capable of more than 150 KW  
22 capacity with plans to establish 350 KW chargers for  
23 interregional travel.

24           And then in April, just last week, EVGo's  
25 consultants, Rocky Mountain Institute released a

1 report on fleet and tariff analysis of the design of  
2 rates that are being proposed by the investor-owned  
3 utilities to facilitate DC fast charging that is more  
4 economic.

5 And so just in the past quarter there's been  
6 a large amount of progress in the industry. We'd  
7 like to understand how the POUs can account for this  
8 advanced technology and bring these new loads  
9 expeditiously online and learn from the experts.

10 So Dave Package from ChargePoint, welcome.

11 MR. PACKARD: Thank you. How we running  
12 that.

13 MR. CRISOSTOMO: Just say, next slide to  
14 Heather.

15 MR. PACKARD: Okay. So I'm Dave Packard  
16 with ChargePoint.

17 COMMISSIONER SCOTT: And let me make sure  
18 the mic's on.

19 MR. PACKARD: We're the high tech company.  
20 I live in the -- it's in the Bay Area and I can't run  
21 a mic. So anyways, I'm Dave Packard. We can go  
22 right to the next slide. You know, and I'm just  
23 going to -- a shameless plug for ChargePoint and then  
24 talk about DC fast charging and our new product, and  
25 then wrap up with a little discussion about demand

1 charges.

2 But you know, when I joined ChargePoint  
3 three years ago they had one product, and since then  
4 we have a product for all aspects of the market,  
5 home, workplace, around town and then corridor  
6 charging. We've developed products for all those.

7 And it just, you know, it's -- I'm bragging  
8 about ChargePoint, but also, it's how fast the  
9 industry's moving. I think our competitors in the  
10 market are moving just as fast coming out with new  
11 products, new technology to make, you know, to make  
12 drivers more comfortable, make side hosts more  
13 comfortable, and to integrate into the grid to make  
14 sure that EVs are the best thing that happened to  
15 utilities and not the worst thing that happened.

16 And when you see some of the load curves of  
17 residential charging coming on and hitting right on  
18 peak you can see how quickly they could become the  
19 worst thing that ever happened. Next slide, please.

20 This is our network. This deck is a little  
21 bit old. We're up to 34,000 ports, but it happens  
22 quickly. And our DC corridors on the east and west  
23 coast, I live in South Georgia and I'm just proud to  
24 say that we have a corridor going by my house.

25 And most of the west coast is taken, but

1 there's a lot of work to be done, you know. And  
2 there's Electrify America and a lot of utility  
3 programs and everything else coming on board, but we  
4 just have a tremendous amount of work to do to get to  
5 a point where we think that the electric vehicles can  
6 become mainstream.

7           Next slide, please. So when we look at what  
8 we're doing in the marketplace, currently, over the  
9 last eight years we know what we're dealing with. I  
10 mean, most of the battery packs are at 400 volts,  
11 about 50 -- I mean, they're smaller packs.

12           You know, the max they take is 50 kilowatts.  
13 We're dealing with three standards right now. Tesla  
14 does their own thing, and then CHAdeMO and the SAE,  
15 and we have to accommodate all that. and most of the  
16 vehicles that are charging on DC fast charging are  
17 BEVs.

18           But when we look to the future it gets a  
19 little scary for a manufacturer and probably a lot  
20 scary for a utility. These cars are -- the battery  
21 packs up to 800 volts, nominal, can take up to 350  
22 kilowatts of power.

23           And when you think about charging hubs with,  
24 you know, four, five, six charging stations, that  
25 gets very scary, very quickly. And so you know, how

1 do we manage all this load? And you know, we have to  
2 make sure that as we do that we take care of all the  
3 vehicles, and we also take care of all the legacy  
4 vehicles to insure that nobody's left in the dust, so  
5 to speak, because this market has to build on its  
6 reputation and credibility moving forward. And we  
7 can't ever have anyone thinking that they've been  
8 left behind.

9           And finally, some BEVs are starting to  
10 charge on DE fast chargers. I don't know how many  
11 people drive the, but I drive a Volt, and that motor  
12 coming on is the worst sound you can imagine. I  
13 mean, it really -- you talk about range anxiety.

14           They call it gas anxiety and it just drives  
15 you crazy that that motor comes on. So I'm really  
16 glad to see that I can get a plug-in hybrid with DC  
17 fast charge. But anyway, so going forward, charging  
18 infrastructure is going to have to be flexible and  
19 scalable and accommodate, you know, limited power  
20 availability from the utilities.

21           Next slide, please. Not to get too much in  
22 the weed in technology, but one of the things that we  
23 look at as we examine how cars charge is that they  
24 all have different rates. But one of the things true  
25 that most of them drop off after hitting a peak very

1 quickly in the charge cycle.

2           So you know, and we've seen this back in the  
3 '90s, the same thing with lead acid batteries. They  
4 go up to a peak and then the charge rate starts  
5 dropping off. So as we develop charging station hubs  
6 how do we take advantage of this.

7           And it's by knowing this we can start  
8 balancing the power throughout the whole hub and make  
9 sure that, you know, we're never designing it to  
10 deliver 350 kilowatts times four charging stations,  
11 if that's what you have.

12           You know, you'll throttle that back a bit,  
13 knowing that most cars are going to hit a peak and  
14 then drop off very quickly, and we can take advantage  
15 of that and provide peaks to other vehicles. And so  
16 you know, in instances you'll get the fastest charge,  
17 but for the most part, actually, you'll always  
18 probably get the fastest charge, but from time to  
19 time, you may, you know, take a little hit on timing,  
20 but just for the -- to facilitate the whole  
21 experience.

22           Next slide, please. So if we look at a  
23 product like this, a development like this, as we go  
24 into developing charging hubs, let's say this one has  
25 four charging stations. Say it's at 350 kilowatts

1 max, and a 350 kilowatt capable vehicle comes in,  
2 they can charge at the full rate.

3 Click, please. But then there's a second  
4 car comes in and the first car starts dropping off.  
5 Say that second car can charge at a full rate, and  
6 that's pretty much maxing out the facility. One more  
7 time, please, on this one.

8 And then we see other cars come in and they  
9 charge at a slower rate, but the whole load is  
10 balanced across the whole facility to insure that we  
11 get all the cars charged, everybody's happy, but in  
12 doing so we don't just demand too -- you know -- too  
13 much power from the utility going into the facility  
14 and we just, you know, calculate what's the nominal  
15 amount that we need to make sure that we have a  
16 proper driver experience.

17 And you know, and again, this is all about  
18 the driver. We want drivers happy. We want them to  
19 think they can get back on the road quickly, to know  
20 they can get back on the road quickly and charge  
21 their vehicles quickly. That's what this is all  
22 about; it's filling a need that the market feels we  
23 have to fill in order for electric vehicles to become  
24 mainstream.

25 Next slide, please. So one of the things



1 that we've had -- and I know this is a sore subject,  
2 Bill Boyce is looking at me, and SMUD's done some  
3 work on this. So that's a good thing. But when we  
4 look at demand charges it really is an impediment to  
5 the market of DC fast charging.

6 We want to deliver a product and have our  
7 customers be able to deliver charges to customers at  
8 a nominal rate, and if we look at the cost of  
9 gasoline maybe as an upper limit that we want to be  
10 able to charge people, and start looking at what  
11 demand charges can do to the economic of a charging  
12 station early on, it gets -- you know -- it gets  
13 pretty critical really fast.

14 This graph is showing what it would -- the  
15 economics of a station that's fully subsidized,  
16 installation, hardware, operation and maintenance is  
17 fully subsidized. And you can see at best you have -  
18 - with Georgia Power's demand charges you need about  
19 20 customers per day.

20 And we go to San Diego we're up to about 80  
21 customers coming through per day at that facility.  
22 And you know, it's all because we have to balance  
23 that demand charge over a number of customers. And  
24 we're not saying demand charges are bad.

25 We understand why they're there, but let's

1 look at them and see how we can moderate them for the  
2 industry so the industry can get going, because once  
3 we have 80 customers a day we can justify and pay for  
4 the demand charges.

5           Next one, please. And here are just some  
6 other curves and you see it gets worse and worse.  
7 And this one is just the -- I think the installation  
8 is paid for and the owner pays for the hardware and  
9 the operations and maintenance.

10           And next slide, please. In here I think  
11 it's 120 a day you need to pass through if you're  
12 going to pay for the hardware, the make ready and the  
13 installation and the operations and maintenance of  
14 the whole unit. So you can see that demand charges  
15 have a drastic effect on the economics of DC fast  
16 charge stations.

17           Next slide, please. So one of the things  
18 you want to look at is onsite storage. There's a lot  
19 of talk about help and some of the storage people  
20 that are here will probably strangle me afterwards.  
21 But as we look at onsite -- if you'd hit the next  
22 slide, and one more time.

23           So we look at today when we have smaller  
24 battery packs and intermittent usage and customers  
25 coming in and charging. There's plenty of time in

1 between the charges to replenish the battery, but  
2 unless we're going to go for massive batteries that  
3 will, you know, can provide for that charging station  
4 through most of the day we run into real problems  
5 when you look at the bottom, with the new size of the  
6 batteries, like the Bolt, now they're coming out, you  
7 know, with much bigger batteries.

8           They're going to charge for much longer. We  
9 start seeing that we're going to knock out the  
10 capability of the battery and its effectiveness to  
11 offset a lot of the demand charges or even time of  
12 use rates during the day.

13           Next slide, please. So one of the things --  
14 that's good -- ChargePoint, we're really focused on  
15 the driver, and I think most of the market is because  
16 it is all about the driver. We really have to have a  
17 great driver experience to get more drivers.

18           You know, if we get a lot more drivers I'm  
19 happy, Tom's happy, Noel's happy, everybody's happy.  
20 So that's what we're after. So how do we get there?  
21 So until adoption rates are high, the return on  
22 investment for DC fast charge stations is very  
23 difficult to show the economics.

24           You know, will drivers have the appetite to  
25 pay a premium. And we don't know what that premium

1 is. And the problem is, one of the advantages of  
2 electric vehicles, as we all know, is you leave home  
3 with a full tank of gas.

4 And now, we're trying to build a model  
5 around a gas station model where now people are  
6 filling up in the wild with a DC fast charger, which  
7 is different than the economics of what we looked at  
8 originally for charging, which was at home, in a  
9 workplace and maybe at the mall.

10 So now, how much are people willing to buy?  
11 And you know, we use the price of gas as a bar and we  
12 think that's correct, and hopefully, people will be  
13 willing to pay up to that amount for the emergency  
14 charge.

15 But basically, I would say today people  
16 think it's gouging if you're charging more than the  
17 price of gasoline, even though you're providing a  
18 tremendous value with a DC fast charge station. But  
19 you know, what -- so when we look at some of the  
20 programs the utilities are doing, some of the IOUs,  
21 there's some great programs and hubs that are being  
22 established.

23 I think Southern Cal Edison has one  
24 proposed, maybe I can't talk about this, but yeah.  
25 Just having hubs around, you know, a large

1 concentration of multi-dwelling units. So perhaps we  
2 start looking at that gas station model.

3           And the combination of perhaps fast charging  
4 and workplace provides a solution for people that  
5 can't get charging at their residence. So now,  
6 you're not charging at home. You're not leaving home  
7 with a full tank of gas, but you're leaving work with  
8 a full tank of gas.

9           And maybe the -- you know -- maybe we work  
10 in the opposite direction, but these things are  
11 things we have to study, that these pilots are going  
12 to be great to help us figure this out and go  
13 forward.

14           And then finally, just, you know, we have to  
15 look at the other recovery mechanisms. And I think  
16 one of the thing we've done today in the market for  
17 L2 delivery is that we look for other ways why people  
18 want to put charging in.

19           We have workplaces putting it in to retain  
20 employees, to keep employees happy. We have retail  
21 shops putting them in to attract customers. We have  
22 -- you know -- the list goes on and on of the  
23 different people putting them in, and the reason is  
24 they're using marketing dollars.

25           And then we have to really take advantage of

1 those marketing dollars to expedite more charging  
2 going in all over the service territories. Next  
3 slide, please. So now, you know, this is half  
4 shameless plug, half about the industry.

5 But this is the product ChargePoint  
6 introduced at the CES show, and it's -- you know --  
7 we took great strides to design a product that's  
8 scalable and it stays with the -- scalable and you  
9 have no risk of stranded assets, because the product  
10 can grow on itself.

11 You know, the design is, you know, we feel  
12 future proofed, allowing scalability, liquid cooled  
13 connectors so we can go up to 400 kilowatts and not  
14 have a cable that's so heavy that nobody can lift it.  
15 It's a modular design that allows for scalability,  
16 and also flexibility in your installation. And it  
17 has the displays needed so people can tell what's  
18 going on.

19 Next slide, please. So basically, the way  
20 that the unit's designed, on the left you can put in  
21 one charging station and then each station can hold  
22 two modules, and each module charges at about 31.25,  
23 about the size of a very large briefcase.

24 So if you put in one station with 31.25  
25 kilowatts, it can charge at that. If you want to

1 upgrade you can have another module installed, and  
2 these are designed so a technician can do it. You  
3 don't need an electrician to come out and install it.

4           So now, you can run that station at 62.5.  
5 When you go to install your second station, our  
6 engineers call them conjoined twins and that's why we  
7 don't let engineers name things, but the two will  
8 work together.

9           So if you have one car pull up and charge at  
10 125 kilowatts it'll draw the power from the other  
11 unit as long as nobody else is plugged in. So you  
12 can go -- and it'll balance it actively through the  
13 charging cycle.

14           So as that car drops off, another car plugs  
15 in, it will charge, as well. And this system is  
16 module all the way up to -- actually, you can get it  
17 to 1,000 kilowatts, which you know, sounds ridiculous  
18 for a passenger vehicle, but as we start looking at  
19 transit buses and we start looking at medium and  
20 heavy duty delivery, that becomes more important,  
21 that we be able to have that ability to charge these  
22 larger vehicles.

23           You know, to them it looks like a level two.  
24 It takes hours to charge even at these rates. Next  
25 slide, please. One of the concepts, and I think

1 everyone's kind of talked about this a little bit,  
2 but something that really kind of hit a nerve, we  
3 were working with some of the smart cities'  
4 applicants, and it was this charging hub concept.

5           And I think we're seeing some of this come  
6 out now, and it's just -- you know -- it's something  
7 that I think we really need to spend some time and  
8 look at, because the capability of getting a whole  
9 lot of people driven by electric vehicles in a short  
10 amount of time, by -- you know -- by getting the  
11 TNCs, the Lyfts and the Ubers of the world to start  
12 getting people driving electric and making it so they  
13 are capable of driving electric and making it through  
14 a day, I have the Dave Packard survey of all the Uber  
15 drivers that I've been with and taxi drivers over the  
16 last couple of months, and that's a lot of them.

17           They tell me they're about 200 miles a day  
18 pretty much across the board. I mean, I'm sure they  
19 have exceptional days where they go higher or lower,  
20 but pretty much you can guarantee 200 miles a day.  
21 And when you have a Chevy Volt and other vehicles  
22 coming out at, you know, a little over 200, you just  
23 have to make sure you can schedule them one time a  
24 day to be able to charge, to make sure they get it  
25 through the day comfortably.



1           So these stations can be scheduled. They  
2 can also be used for buses, can be used for heavy  
3 duty trucks. You know, with intelligent scheduling  
4 and with people like TNCs that know their schedule,  
5 know when they'll need a charge, we can start  
6 balancing this out to get the kind of usage we need  
7 out of these stations to, you know, offset the  
8 effects of demand charges, if you will. But it's  
9 also an intelligent way to use our assets.

10           Next slide, please. And just in summary,  
11 you know, we have a lot of different electric  
12 vehicles coming out, a lot of different capabilities.  
13 I mean, we're still testing this market and trying  
14 different things.

15           Battery prices are just -- you know, I've  
16 been in this industry as long as Bill Boyce, if you  
17 can believe it, 20 years, 25 years, and the batteries  
18 that we've gone through and the technology is just so  
19 far advanced it's unbelievable.

20           You know, I hear rumors of 80 kilowatt hour  
21 -- \$80 per kilowatt hour lithium ion batteries in, you  
22 know, five to 10 years, and that just blows me away  
23 to think we could ever get there. And we know that  
24 we're going to get there, and you know, it's going to  
25 change the automotive industry completely.

1           But anyway, so the products we develop, the  
2 products Tom develops are going to have to be future-  
3 proof and have flexibility in order to accommodate  
4 these different vehicles that are coming on the  
5 market. You know, hopefully we can do something  
6 about demand charges.

7           Love to see that generated by the utilities,  
8 because they know what the needs and wants are of  
9 their industry and we'd love to work with them and  
10 get that done. And this deck is old and I have to  
11 apologize to some others in the room, but Pacific  
12 Power was the first one that really came out with a  
13 redesigned rate plan around demand charges.

14           SMUD has since come out with a proposal on a  
15 new rate and so has Southern Cal Edison. And you  
16 know, again, the more utilities will look at this, we  
17 can try different things and see what works, and work  
18 with the industry to make sure that, again, we just  
19 take care of all the needs and wants of both the  
20 providers and the industry. Thank you.

21           MR. CRISOSTOMO: And now for Tom Ashley from  
22 Greenlots.

23           MR. ASHLEY: Thanks, Noel. So I'm Tom  
24 Ashley from Greenlots, and I don't make products. My  
25 company does, but I definitely don't. Occasionally,

1 I make a little bit of policy. I was asked to  
2 present on our CEC GFO 16303 award, and I won't  
3 bother you with the title of it.

4 But you know, over the course of the next  
5 number of slides I really want to sort of present  
6 both a challenge and sort of how Greenlots takes a  
7 look at some of the challenges that the market faces  
8 to really offer technology solutions.

9 Next slide, please. So as Dave mentioned  
10 earlier, it is all about the drivers. And the mantra  
11 in the industry is happy drivers, happy site hosts.  
12 And so as much as possible, whether we're talking  
13 about specific software development or just operation  
14 in support of our clients, it's really to make sure  
15 that that driver is taking care of every time, all  
16 the time.

17 And with where we are in the industry in  
18 terms of being really at the front end of adoption  
19 and really having a fairly significant infrastructure  
20 deficit, that's not always the easiest thing to  
21 accomplish.

22 For those of you who are maybe less familiar  
23 with Greenlots, we are a technology company and we  
24 really focus on EV charging software and services,  
25 with a very strong focus on smart charging. And

1 smart charging means many different things.

2 But for us we've really focused on basically  
3 a definition around future-proofing and developing  
4 interoperability, both through communications, as  
5 well as, you know, future-proofing and creating sort  
6 of an energy interoperability going forward, so that  
7 we're really focused on effectively minimizing the  
8 cost involved with deploying and operating charging  
9 infrastructure.

10 And we're able to, you know, really stay  
11 ahead of the market and help identify, again,  
12 creative solutions to sometimes technology barriers,  
13 sometimes behavioral barriers and sometimes business  
14 model barriers.

15 We have not yet deployed 34,000 charge  
16 ports. We are less than 10,000 and have really  
17 focused on scaling the robustness of our technology  
18 to meet sort of the growing scale of the industry.  
19 and so we've really split our focus, I would say  
20 fairly evenly, between supporting the deployment of  
21 DC fast charging, both nationally and  
22 internationally, and really developing that  
23 robustness of smart charging technology to deploy  
24 grid integrated charging, whether it be level two, DC  
25 or in some cases even level one.

1           Next slide. So as you've probably heard  
2 before and you'll probably hear many, many times  
3 again, with where we are with the scale of EV  
4 adoption, DC fast charging really is a difficult  
5 business proposition.

6           There are pretty significant costs  
7 associated with deploying this technology and this  
8 infrastructure from a capital standpoint. And there  
9 is at this stage in the market still very low  
10 utilization.

11           And yes, indeed, Dave is correct that scale  
12 maybe solves all. Where we're talking about moving  
13 forward, both with this technology concept, but  
14 really to improve the business model across the  
15 industry is to effectively solve utilization.

16           Increasingly, site hosts are having more and  
17 more difficulty with demand charges, which in and of  
18 itself may not be fully solved by higher utilization,  
19 but we definitely see a very strong correlation  
20 between rate design and utilization and hitting some  
21 inflection point at some unknown time, hopefully in  
22 the next couple years.

23           And then somewhere more of the subject of  
24 this panel, we really are seeing increasing power  
25 demands, both in terms of the power that's going to

1 an individual car and the power that's required at a  
2 site to support the deployment of multiple DC fast  
3 chargers or greater scale of AC level two.

4           Next slide, please. So the application that  
5 we submitted and that ultimately was successful had a  
6 number of goal elements. The first part really is to  
7 integrate within the context of one integrated  
8 platform, the management both of charging and  
9 storage.

10           And then within -- with that as a baseline,  
11 to effectively aggregate or in this context maybe  
12 simulate an aggregation of DC fast charging loads to  
13 help facilitate in this case we can call it site  
14 level, distribution system level or even larger grid  
15 level scale integration of DC fast charging, as well  
16 as supporting electric fleets.

17           You can go to the next slide. So I think we  
18 all understand the concept that co-locating some  
19 storage can help reduce demand charges. And if the  
20 only thing that you're focused on is reducing demand  
21 charges, co-located stationary storage is highly  
22 effective.

23           But if you are in fact interested in having  
24 a business model that is profitable, co-locating  
25 storage on its own as a solution for demand charge

1 reduction is not currently a winning proposition.  
2 Even here in California, where we support the  
3 deployment of storage really unlike anywhere else in  
4 the country, if you are lucky enough to sort of be  
5 granted an SGIP, you know, incentive, deploying  
6 storage even with SGIP to reduce demand charges still  
7 is not a winning business proposition for the most  
8 part.

9           And so the question is, you know, what other  
10 value streams do we need to identify to start turning  
11 the tide and make that a winning business  
12 proposition. If you can go ahead to the next slide.  
13 So I apologize for the size of some of this font, but  
14 basically, this is demonstrating or visualizing over  
15 a few day period the utilization of a single DC fast  
16 charger in urban Los Angeles.

17           And what you should take away from this  
18 slide more than anything else is that utilization  
19 varies significantly, and it's very difficult to  
20 predict when something is going to be utilized, even  
21 if you are sending out price signals.

22           And so effectively, if you're a site host,  
23 an owner/operator of this charging location, there's  
24 very little you can do outside of a technology  
25 solution to really offer anymore certainty of what

1 you're going to be looking at from an energy cost  
2 standpoint or what your ceiling might look like from  
3 an energy cost standpoint.

4           And as you can see, there are large portions  
5 of these time periods where there is no utilization  
6 or very low utilization. Next slide. So while  
7 there's still some pretty significant spikes here,  
8 this is an illustration during a fairly similar time  
9 period of multiple DC fast charge locations, so  
10 multiple stations, multiple sites.

11           And while again there is significant  
12 spikiness, there is starting to -- it's starting to  
13 balance out a little bit more. They're starting to  
14 see some patterns are starting to emerge. And so  
15 effectively, just like the distribution system as a  
16 whole, we felt that to reduce the cost of owning and  
17 operating a DC fast charger or a set of DC fast  
18 chargers, we needed to be able to find a way to  
19 increase the utilization and effectively increase the  
20 load factor.

21           And so I will -- I'll say next slide,  
22 please. Thank you. So this is a day, a day in the  
23 life, and as you can see this, again, is multiple DC  
24 fast chargers. And right in the middle of this is  
25 the -- we'll call it the belly of the duck.



1           And as you can see, based on, again,  
2 utilization across these fast chargers in urban Los  
3 Angeles over a random period, about a week and a half  
4 ago, this is what it looked like. So the charging is  
5 happening basically at times when maybe we'd prefer  
6 or the system operator would prefer that it not be  
7 happening, or indeed, it's not happening at times  
8 when the system operator would prefer that it did  
9 happen.

10           And so beyond backing up, you know, these  
11 charges with stationary storage, we felt that we  
12 really needed to find a way to increase that  
13 utilization and spread out the variance of the  
14 utilization to something that's a little more  
15 predictable.

16           And as we're moving forward, you know, in  
17 Los Angeles we work very closely with the city to  
18 support their EV fleet adoption and deployment. And  
19 increasingly, we all know that TNCs and any number of  
20 other fleet operators are moving towards  
21 Transportation Electrification.

22           And so for this project we really focus on  
23 identifying various price signals and communication  
24 methodologies to increase the load factor, and in  
25 this case, make sure that the belly of the duck is

1 being addressed from a charging standpoint.

2 And indeed, the hope is that by doing that,  
3 not only are we, you know, raising the belly, as it  
4 were, but we are also, you know, lowering the neck  
5 or, as we like to say, encouraging the duck to bow  
6 down.

7 (Laughter)

8 If you can go to the next slide. Again, I  
9 realize it's a little small for you in the room, but  
10 this is the rough architecture of this solution. So  
11 on the left slide there are four DC fast chargers.  
12 Thank you.

13 And while we are going to locate these all  
14 in one location, we are going to pretend that they  
15 are in four different locations. And so we are  
16 effectively going to be simulating an aggregation of  
17 these DC fast chargers, but with the sort of cost  
18 efficient standpoint of having co-located battery  
19 storage, site controller and, you know, transformer  
20 and electrical service.

21 We are then going to be -- on the right side  
22 is the communications layer and the software side,  
23 which really speaks to the communications that are  
24 happening between different stakeholders. So you can  
25 see the line connecting these two sides, that's OCCP,

1 which is the open charge point protocol, which we've  
2 really built our communications between software and  
3 hardware around for the last number of years.

4           And increasingly, OCCP is able to take more  
5 and more sophisticated energy signaling. And so we  
6 really find that OCCP is able to handle and indeed,  
7 the continued development of OCCP, is able to handle  
8 pretty much everything that we want to throw at it.

9           And then we have the communication between  
10 our software platform and the utility. In this case  
11 it looks like it's going to be Southern California  
12 Edison, and that's happening primarily through Open  
13 ADR 2.0, but there are multiple methodologies that  
14 can be supported.

15           And then we're also going to be  
16 communicating, both to drivers individually, but also  
17 fleet managers and the operators of all electric  
18 fleets. So I'll end there and look forward to  
19 answering questions.

20           MR. CRISOSTOMO: Thank you both for great  
21 presentations. I saw one slide that I thought  
22 captured a commonality for slide three from Tom,  
23 noting high infrastructure and installation costs,  
24 low utilization, high demand charges and increasing  
25 power demands.

1           That leads me to one question link. How can  
2 we synthesize those new fundamentals in the way that  
3 you're designing your charging systems into a request  
4 for the utilities as to how they can accommodate a  
5 streamlined interconnection?

6           Or I guess conversely for the POUs, how can  
7 -- what would the best experience be for you in  
8 interfacing with a new project?

9           MR. ASHLEY: I'll start. Thanks, Noel. So  
10 while, you know, this is -- there's a limit to what  
11 is possible, even with the best technology in the  
12 market, we do want to communicate that as much as  
13 possible we want to recommend, basically, a software  
14 heavy and an infrastructure light approach.

15           So whether you think about it as cost  
16 minimization or an increasing value or access to  
17 value streams, it's the software that can unlock a  
18 lot of that. And whether you sort of take the  
19 example of, say, deploying four AC level two charge  
20 stations on electrical service that can only support  
21 two of them, providing full power simultaneously, you  
22 know, you're able to effectively charge more vehicles  
23 per dollar by tapping into the power of software  
24 technology.

25           I think that, you know, I don't want to say

1 that's a copout, because we feel very strongly about  
2 it, but as we're moving forward, especially with more  
3 and more installations at higher and higher powers,  
4 it's really a question of how do you right size.

5           And that's a balance, while we've talked  
6 about sort of different solutions to supporting more  
7 power or power balancing, it's still a question of,  
8 you know, how much service do you run in the first  
9 place to support that site.

10           And I think that that's where we need to  
11 get, is a better understanding of what our strategies  
12 are for right-sizing, whether you want to call that  
13 future-proofing or something a little bit different.

14           MR. PACKARD: Yeah. I guess I'd just say  
15 that for utilities looking at programs, look at it  
16 from the driver's standpoint. And we all have our  
17 own concerns in what we need, but above all, the  
18 driver needs to feel comfortable they can get what  
19 they want.

20           And possibly even look at the whole market  
21 as a holistic being and not worry about, you know,  
22 and this may be a way -- I know some of the utilities  
23 are looking at a way to justify some wavering on  
24 demand charges.

25           But if we look at home charging, we look at

1 some grid services as far as demand response and, you  
2 know, voltage regulation, frequency regulation, can  
3 we take some of those advantages out of the market  
4 and put those, kind of pool those and say, this is  
5 the overall advantage we're getting to the grid from  
6 electric vehicles.

7           So we ought to be able to waive demand  
8 charges. I don't know. It's just a different way of  
9 thinking about things, that maybe there are other  
10 ways. I just get a little worried when we start  
11 talking about a lot of control over DC fast charge  
12 stations, because you know, how would it disrupt your  
13 day if you went to the gas station also and you  
14 realized it was going to take 45 minutes and not five  
15 minutes to fill up your car.

16           It starts ruining the driver experience, and  
17 I think that's something that we really have to make  
18 sure that we're cognizant of. And you know, there's  
19 so many things we have to do it's just unfortunate,  
20 we have to do it.

21           But let's make sure if we are doing it, if  
22 we're affecting the driver experience, that we do it  
23 with our eyes wide open and know the impacts of that  
24 on the industry.

25           MR. CRISOSTOMO: Well, I have a ton of

1 questions, but I also want to defer to Commissioner  
2 Scott or Commissioner Peterman.

3 COMMISSIONER SCOTT: I did have one question  
4 for you, Tom, on your slide with the renewables  
5 integration with dispatchable charging, which was  
6 number eight. And I thought that was really  
7 interesting to kind of take a look at when people are  
8 using the DC fast chargers, and it's sort of at  
9 exactly the times where we would not want them to be  
10 using DC fast chargers, at least in southern  
11 California during that one week.

12 Do you have a sense of what it looks like in  
13 other parts of California in other times of the year?  
14 Or is this kind of our first snapshot into that?

15 MR. ASHLEY: Well, I will just say that I  
16 don't know that this is necessarily, you know,  
17 illustrative of any particular geography, you know,  
18 over any time frame. This was, you know, a couple  
19 weeks ago, random L.A.

20 but I do believe and I can have my team  
21 followup with you on the data side, but I do believe  
22 that this is a roughly accurate illustration of what  
23 we're seeing in certain types of deployments; again,  
24 use cases very significantly for when and how people  
25 are accessing this charging infrastructure.

1           But this is obviously a fairly concerning  
2 trend or possibility, and I think that what I would  
3 encourage is, you know, we've been talking about time  
4 of use rates for quite a while to, you know, help  
5 fill in, say, overnight charging or something else.

6           And certain utilities are looking at much  
7 more dynamic versions of effectively time of use or  
8 day ahead pricing signals. And we are not thinking -  
9 - we have not been thinking for the most part about  
10 time of use rates or signals for DC fast charging,  
11 because inherently, as Dave very, you know,  
12 importantly mentioned, you know, this is how we get  
13 around. These are gas stations for cars going  
14 forward.

15           And so there is going to be an absolute  
16 inelastic demand for a lot of drivers for this type  
17 of charging. So it's really focusing on the types of  
18 vehicles, the types of drivers that have more of an  
19 elastic demand.

20           COMMISSIONER SCOTT: Commissioner Peterman,  
21 did you -- okay.

22           MR. ASHLEY: All right. Well, thank you,  
23 Tom, and thank you, Dave. And I'll call up the POU  
24 representatives for our next panel.

25           COMMISSIONER SCOTT: For those listening in



1 on the WebEx, give us just a minute. We're bringing  
2 up the new panel and getting everything in order for  
3 them to start. While they're organizing themselves,  
4 I'll remind folks, if you would like to make a  
5 comment please fill out a blue card. They're on the  
6 table up front.

7           Make sure you get it to Heather, who's over  
8 there behind the podium. She'll get it up to me and  
9 that's how I'll know that you want to make a comment  
10 when we get to that portion of our web -- web page --  
11 of our Workshop.

12           MR. CRISOSTOMO: Thanks Commissioner Scott.  
13 Sorry for the little delay, everyone. We're changing  
14 the order just a little bit, but I realize that it  
15 won't affect the IEPR team too much, because we only  
16 have one presentation that we're -- or two  
17 presentations that we're looking at visually.

18           So I'll introduce our panel of publicly  
19 owned utility representatives. So we're welcoming  
20 here to help plan for the electrification in your  
21 grids. And I'll set off, everyone has 10-minute  
22 presentations with just this broad prompt for  
23 everyone in the audience.

24           We ask the POUs to respond to the Draft  
25 Transportation Electrification Guidance, and this

1 concept of how we can work together to gather  
2 information and develop the capacity in planning and  
3 deploying electric transportation.

4           Second, we wanted to learn the latest about  
5 what your members and your utilities are doing to  
6 plan for EV load as a resource in the grid since we  
7 last met you guys in October, and third, to proffer  
8 ideas of how the Energy Commission can be helpful in  
9 meeting our shared Transportation Electrification  
10 goals.

11           And so in the interest of queueing everyone  
12 up per your request, we'll have Barry Moline from the  
13 CMUA, Municipal Utilities Association, then followed  
14 by Nancy Sutley of Los Angeles Department of Water  
15 and Power.

16           Third, Bill Boyce from Sacramento Municipal  
17 Utility District, fourth, Kapil Kulkarni, from  
18 Burbank Water and Power, followed by Jonathan  
19 Changus, from the Northern California Public Power  
20 Authority, and Bryan Cope, from the Southern  
21 California Public Power Association. Barry, please  
22 lead off.

23           MR. MOLINE: Thanks, Noel. Noel,  
24 Commissioner Scott, I'm Barry Moline, with California  
25 Municipal Utilities Association, and want to tell you

1 clearly that the POU community supports, strongly  
2 supports increasing Transportation Electrification.

3           And like the previous panelists, I drive a  
4 Chevy, an EV, and I've had a positive experience. So  
5 I walk around telling people all about it. We  
6 recognize this opportunity as a way to increase  
7 services to our communities, one that has the ability  
8 to reduce emissions and greenhouse gases.

9           And we also need to recognize that there's a  
10 customer perspective that we need to focus on,  
11 because customers are ultimately the ones that must  
12 make the purchase decisions for an electric vehicle.  
13 And for example, a city or utility can control the  
14 investment that we make in electric transportation,  
15 such as buses or vehicle fleets, but that's our  
16 choice based on budgets and available capital and  
17 local interest.

18           But creating a consumer market, as we know  
19 in light duty vehicles, is a whole other matter. We  
20 recognize that now we're sort of getting into an  
21 engagement like we're Starbuck's. We're trying to  
22 create a new latte drink and we're trying to get  
23 people to try it and then to ultimately buy it,  
24 create demand for it.

25           Or we're like Apple versus Samsung, trying

1 to present to the public a reason why they should  
2 choose one over the other. So we don't control  
3 consumer behavior, but we'd like to transform that  
4 market, and we also need to move carefully because we  
5 are investing the public's money in this endeavor.

6 Many POU's have or are developing innovative  
7 programs to provide charging infrastructure,  
8 incentives and rate structures to encourage  
9 Transportation Electrification. And in each  
10 community there's a different customer makeup,  
11 different needs, different preferences, different  
12 infrastructure and other unique factors.

13 And as a result, POU's need to tailor their  
14 programs to fit their local communities. So a  
15 program that is successful in one community may not  
16 be successful in another community. And a driving  
17 factor in the way -- that was not meant to be a joke,  
18 but what the heck.

19 A driving factor in the ways that POU's think  
20 and move is to share best practices, and learning as  
21 much as we can from each other. And there's an  
22 important reason why, and that's because our  
23 governing boards are elected officials, and they are  
24 accountable and responsible to our local communities  
25 and to the public.

1           They feel the urge to be leaders and invest  
2 in new efforts like electric transportation, but as  
3 you know, they're stewards of the public's funds, and  
4 as a result they have a strong desire and urge to  
5 invest wisely.

6           And that's why our governing boards like to  
7 know that the investment they are making in new  
8 infrastructure will achieve its intended goal and  
9 have a positive, because the corollary is that they  
10 make a bad investment, they look bad, they're on the  
11 front page of the paper and then they're not elected.

12           So that's the balance that we live with and  
13 sharing best practices helps us make those wise  
14 choices and avoid a wasted investment. So while  
15 we're actively promoting Transportation  
16 Electrification we also have to recognize that it's  
17 still in the early phases.

18           And while we believe the primary focus of  
19 expansion should be on doing what it takes to grow  
20 the number of EVs on the road, or I'm sorry, the  
21 primary focus should be to grow the number of EVs on  
22 the road, we believe that all other goals should be  
23 viewed secondarily.

24           And we think that they're valued goals, to  
25 look at the integration with the electric utility,

1 but number one is getting more EVs on the road. So  
2 that way we can transform that market. So regarding  
3 data collection, we also see the need for greater  
4 data.

5 And we'd like to insure that the collection  
6 of this data is not duplicative or overly burdensome  
7 and that it is -- the data we're collecting is  
8 targeted toward growing the market. We don't want to  
9 be over-burdening consumers.

10 One key role that the CEC can provide is  
11 collaborating with the ARB and the CPUC to develop  
12 common metrics and technologies that estimate the use  
13 of electricity from EVs, and in particular, the CEC  
14 can work with ARB to develop the methodology for  
15 estimating the amount of EV load that a utility has  
16 without requesting unrealistic and specific metering  
17 for each vehicle. So thank you. We appreciate the  
18 opportunity to work with you on this important issue.

19 MR. CRISOSTOMO: Thanks, Barry. And next to  
20 Nancy.

21 MS. SUTLEY: Thank you very much, and thanks  
22 for having us here. We appreciate the opportunity to  
23 talk about LADWP's investments in supporting  
24 Transportation Electrification, and we believe that  
25 Transportation Electrification clearly is key to

1 meeting the state's greenhouse gas emission reduction  
2 goals, and certainly, our local air quality standards  
3 in the south coast basin.

4           We have a long history of investing in EV  
5 charging infrastructure, as does the City of Los  
6 Angeles, and there are aggressive goals around  
7 electrification throughout the city's Sustainability  
8 Plan, which goes through 2035.

9           LADWP prepares an Integrated Resources Plan  
10 and our 2016 IRP update, the goals in the IRP update  
11 were around environmental stewardship, around  
12 reliability and competitive rates, and this looks out  
13 20 years.

14           And included in our strategies to meet our  
15 greenhouse gas emission reduction goals are early  
16 coal replacement, higher levels of renewable  
17 portfolio standard investments in energy efficiency,  
18 local, solar, energy storage and investments in  
19 Transportation Electrification.

20           And in our recommended IRP case at 2036 it  
21 includes a 65 percent RPS, a 15 percent energy  
22 efficiency, which is slated to achieve by 2020, 1500  
23 megawatts of local solar, 400 megawatts of energy  
24 storage and high levels of electrification, the  
25 equivalent of 580,000 electric vehicles in Los

1 Angeles by 2030.

2           And in looking at our -- looking at the IRP,  
3 one of the things that we did was to evaluate the  
4 relative greenhouse gas emission reduction costs  
5 among the IRP cases, and among the strategies. And  
6 the most cost-effective between the base case and the  
7 recommended case, the most cost-effective way was to  
8 increase from the base level of EVs to a higher level  
9 of EVs.

10           So the incremental costs of those greenhouse  
11 gas emission reductions associated with going from a  
12 base case EVs, about half of what was in the  
13 recommended case, to the recommended case it was the  
14 lowest by literally orders of magnitude.

15           So these are, in terms of greenhouse gas  
16 emission reductions, increasing our investments in  
17 Transportation Electrification, is remarkably cost-  
18 effective. And so we believe that it's time for the  
19 State of California to recognize those greenhouse gas  
20 emission reduction benefits of investment in EV  
21 charger and to find ways to support that through  
22 incentives for charging infrastructure or other  
23 methods supporting that.

24           So to get to DWP's program, we're spending  
25 about \$21 million through 2018 in our Charge Up L.A.



1 Program, which was approved by our Board last year,  
2 2016, with the goal of reaching the equivalent of  
3 145,000 plug-in vehicles by 2021, to increase vehicle  
4 purchases and to emphasize public and workplace  
5 charging in our plans.

6 And the Charge Up L.A. Plan has six parts  
7 around education and outreach, which has already been  
8 spoken to a little bit. Through the city fleets, in  
9 the sustainability plan 50 percent of new light duty  
10 city fleet vehicles will be battery electrics, and  
11 100 percent of our new light duty vehicles will be  
12 plug-ins.

13 And you may have heard about LAPD, our  
14 police department has purchased is the largest fleet  
15 of non-pursuit electric vehicles and is demonstrating  
16 a pursuit vehicle. In this -- we have invested and  
17 we continue to invest in city infrastructure, in  
18 public charging, in city fleet charging and in  
19 rebates for workplace charging.

20 We have 187 public chargers on city  
21 facilities thanks to a CEC grant, including at our  
22 zoo and the libraries around the city to insure that  
23 we are reaching all parts of the city. Our bureau  
24 streetlights is demonstrating light pole chargers,  
25 with plans to install more than 30 of them.

1           We've done a couple of utility pole charger  
2 demonstrations and 16 fast chargers near our freeway  
3 interchanges as part of a DOE Smart Grid Grant. In  
4 terms of rebates, we provide up to \$500 for a level  
5 two charger for residential chargers, as well as an  
6 EV rate for our residential customers that have a  
7 separate meter, and up to \$4,000 for level two EV  
8 chargers in public, workplace -- for commercial,  
9 public, workplace and multi-unit dwellings.

10           And the areas around medium and heavy duty  
11 trucks we're working closely with the Port of L.A.,  
12 with the airports, with LAWA and with the MTA and our  
13 own DOT in terms of supporting their conversion of  
14 certain parts of their fleet to electric vehicles.

15           So we're doing a lot. We want to do more.  
16 So we're working on some plans to expand our  
17 programs. Our model is not to own the chargers, and  
18 we also have strong city policies to support  
19 increased electrification across what the city can  
20 do.

21           We recognize we need to move faster. We are  
22 taking advantage of every dollar that we can find to  
23 support this charging infrastructure. We participate  
24 in the LCSF Credit Program. We're trying to sell  
25 some right now.

1           We've generated, throughout the history of  
2 the program, more than 70,000 LCFS credits, and have  
3 plans of what we can do with the money once we're  
4 able to sell those credits and look at it for an  
5 opportunity to fill in some of the gaps, to close  
6 some of the gaps in our Charge Up L.A. Program.

7           And again, that's still not enough to move  
8 quickly, and we really believe that there has to be a  
9 way to find some incentives through the greenhouse  
10 gas emission reduction programs to support the level  
11 of EV charging infrastructure that we need. Thank  
12 you.

13           MR. CRISOSTOMO: Bill.

14           MR. BOYCE: Good afternoon. I think I do  
15 have a presentation, so if they could spool it up  
16 that would be good. All right. Thank you. Go ahead  
17 and go onto the next slide. I can see it from there,  
18 too. Thanks, Barry.

19           Just kind of give you a quick status of  
20 where we're at as an organization at SMUD with  
21 regards to the light duty, our plans are pretty well  
22 set going forward. We've essentially been really  
23 incorporating Transportation Electrification load  
24 into everything we do on resource planning since  
25 about 2012.

1           So our market projections, you'll see those  
2 in a second, we're updating those right now, kind of  
3 given the new Scoping Plan. New customer programs  
4 launched this year. Actually, also some new  
5 elements, though, the Scoping Plan.

6           We're also going to be looking at program  
7 adoption effectiveness, and then lastly, new  
8 projections for the ultra fast charging stations  
9 coming up. Also, internally, in support of all the  
10 SB 350, we've got quite a IRP scenario planning going  
11 forward, which includes Transportation  
12 Electrification scenarios into all of that.

13           Next chart. This really shows what marketed  
14 option we're looking at. What we typically do is we  
15 take the state numbers and we divide it by our  
16 population percentage. We're four percent of the  
17 state's population, and that breaks down to where  
18 we're at.

19           We think the natural market by 2030 if we  
20 don't do anything will end up being around 44,000  
21 vehicles. But to reach the latest Scoping Plan, and  
22 I'm looking at Jonathan behind me and that's why,  
23 that number up there is around 162,000, corresponds  
24 to about 4.2 million vehicles in the state.

25           Right now, our program spending is

1 attempting to get us up to that current target level.  
2 Next chart, please. So comments that we had with  
3 regards to the Guidelines kind of feed back to Staff.  
4 Concurrence with the Guidelines, we think that  
5 related growth and expected low profiles, we have a  
6 lot of those in place.

7           Emission estimates are all consistent with  
8 what we've already been doing at SMUD. Also, the  
9 request for what we're doing to invest to support the  
10 market, we already have all that information, very  
11 consistent with what we have ongoing, and then  
12 identification of how to get disadvantaged community  
13 members engaged and looking at different target  
14 groups.

15           One thing we did not see in the --  
16 basically, the guidelines that we think you might  
17 want to take a look at is, really, also trying to  
18 track what sort of grid impacts TE are causing the  
19 individual utilities, and really trying to get a  
20 handle on costs.

21           We keep talking about, you know, what are  
22 the program things that we can do to get people to  
23 buy the cars, but let's recognize that some of this  
24 will also cause grid impacts and we ought to be  
25 tracking that for cost-benefit analysis, and also to

1 get a handle on what sort of rate impacts that could  
2 cause.

3 I've got a chart later on. Our new 2017  
4 initiative is next on the chart, please. We've  
5 actually launched a whole bunch of stuff. We've had  
6 quite an ad campaign. If you've been in Sacramento  
7 you've seen ads, probably in the last month and a  
8 half, but we've upped our incentive level.

9 Last year in 2016 it was \$300 a vehicle.  
10 This year it's 599. We actually market that as free  
11 fuel for two years, getting quite a bit of uptake on  
12 that. We've doubled our advertising and outreach  
13 awareness campaign. We've launched full workplace  
14 charging.

15 We've launched DC fast charger incentive  
16 pilots. So this is where we've moved away from a  
17 SMUD owned and operated to a private sector. Working  
18 with regards to some community school bus efforts,  
19 and I've got more information on that.

20 That's in partnership with other regional  
21 entities and getting funding from ARB. Fleet  
22 workplace, more on the R&D, taking a look at fleet  
23 assessment tools, more managed charging research, and  
24 then also taking a look at medium fuel, heavy duty  
25 fuel switching or things like truck refrigeration

1 units, and we'll be looking at forklifts later this  
2 year.

3           Next chart, please. So looking at  
4 disadvantaged community, there was a request to see  
5 what we were doing. The SMAQMD and SHR is Sacramento  
6 Housing and Redevelopment Agency, working with them  
7 on a share car deployment project at the Housing  
8 Redevelopment Association properties. That is CARB  
9 Grant supported and that's really trying to get  
10 shares cars into some of those facilities.

11           I already kind of mentioned the school bus  
12 effort, but that's also with the Air Quality  
13 Management District, working with three different  
14 school districts in Sacramento. Really, what we're  
15 bringing to the party is the charge infrastructure  
16 scope to support that.

17           And then lastly, our own fleet is also  
18 located in a disadvantaged community area itself off  
19 of South Bradshaw, and we've got fleet  
20 electrification expansion plans going forward.  
21 Multi-family dwelling, EVSC Incentive Program, we're  
22 also hoping to get more of that into the  
23 disadvantaged community area.

24           We're seeing actually more uptake in that in  
25 new construction type activities and just retrofits.

1 Okay. Two more real charts to go. What are we doing  
2 for private and service providers? We have developed  
3 a sale for resale policy.

4 I'll just put in a plug for LADWP. I think  
5 we plagiarized their policy really well. So they did  
6 some great groundbreaking work there. Give Nancy and  
7 her team credit. Dave Packard alluded to this.  
8 We've actually had a commercial EV pilot rate without  
9 a demand charge since 2015.

10 That really is a flat rate. If you were to  
11 think about how you would want to go to a gas station  
12 and buy electricity you would not want to see  
13 different times of day. You wouldn't want to see  
14 summertime versus wintertime rates.

15 You wouldn't want to see demand charges. So  
16 that rate was really basically designed to meet that  
17 need. For an aside, that's one of the things -- I'm  
18 headed off to the EWAB accelerator right after this,  
19 and people are interested in how we develop that rate  
20 for other types of applications.

21 And then lastly, going to an incentive model  
22 for workplace and DC fast charger, also directly  
23 support there. Next chart. This chart is actually  
24 one we have had for a long time, but I kind of wanted  
25 to underpin things like grid impacts, cost and the



1 things that we look at with regards to smart  
2 charging.

3           If you take a look at this graph it really,  
4 what we tried to do was look at our whole system of  
5 what it would take to upgrade it to handle different  
6 types of vehicle scenarios. And what this is, is  
7 this is if every single car charged at these levels  
8 off to the right, so if every single car in SMUD  
9 service territory charged at 6.6 kilowatts at 8:00  
10 p.m., which is essentially on peak for us, it would  
11 cause that type of replacement rate of which we would  
12 -- if you look out there at the 164,000, that would  
13 be something like \$35 million a year.

14           Likewise, if you go down, 3.3 kilowatts is  
15 less than 15, and then two kilowatt charging is in  
16 the five. So what it really tells you is charging  
17 level by far and away is much more of an impact than  
18 time of day.

19           The other one, though, that's there is we  
20 get into conversations with smart charging a lot, and  
21 taking a look at, okay, if you were to institute a  
22 smart charging system and I had to go to a smart  
23 network charger that had something like a \$200 a year  
24 networking fee per vehicle, you can see how much that  
25 costs.

1           And so you know, I could afford to upgrade  
2 my whole grid for full peak charging, or pay for a  
3 managed charging fee. So I guess the emphasis for  
4 this is really, and one of my messages, that we  
5 really also need to work on very low cost, managed  
6 charging schemes.

7           If you look at the very bottom of that, if  
8 we were able to figure out how to smart charge at  
9 zero dollars per network fee and how do you do that,  
10 you can see that, you know, it gets you way down  
11 there.

12           But just managed charging in and of itself  
13 has to come with costs tied to it. We need to be  
14 cognizant of those costs and, really, how do we look  
15 at all those things going forward, because playing in  
16 markets like ancillary services, reg up, reg down,  
17 all that gets to be, you know, a cost driver.

18           So last chart. Resource planning since  
19 2012, kind of like what Barry mentioned. Everything  
20 we're doing right now is really focused on increasing  
21 adoption. We also think there needs to be  
22 significantly more funding brought to infrastructure  
23 in the state.

24           When we look at the IOUs, their investment,  
25 we look at Electrify America's investment, we look at

1 the POU investment, we still see a gap. So we still  
2 see plenty of room for everybody. We need to do as  
3 much and more as possible.

4 LCFS funding, I think primarily in the POU  
5 world this is really important funding. We use it to  
6 support all those vehicle incentive programs and all  
7 that. If that type of funding goes away it's going  
8 to be very difficult to go back to our boards and,  
9 really, business cases will really have to be mutated  
10 quite a bit in order to support things.

11 And then lastly, carbon reduction. Going  
12 forward, this is one when we start looking at IRPs,  
13 and Nancy kind of also talked to this. You know, you  
14 can get a lot reduction of greenhouse gases through  
15 electrification than through some of the other  
16 utility, and really need to make sure that we don't  
17 cause problems on the utility side in order to cross-  
18 sector shift from the transportation oil sector.  
19 That's all I have.

20 MR. CRISOSTOMO: Bill, a clarifying point.  
21 Could you define the difference between smart  
22 charging, and then the all vehicles at 8:00 p.m.? Is  
23 the smart charging like dynamically valley filling or  
24 something?

25 MR. BOYCE: Smart charging, at least the way

1 we analyzed it for what we had, was being able to  
2 make sure that no charging was coincident to each  
3 other, they were sequentially back to back to back,  
4 and primarily at nighttime between midnight and 6:00  
5 a.m.

6 The key thing is, no two vehicles charged at  
7 the same time. So it would be able to spread it out  
8 on any given transformer.

9 MR. CRISOSTOMO: Okay.

10 MR. BOYCE: So we really looked at it in a  
11 pretty granular fashion.

12 COMMISSIONER PETERMAN: So just a followup  
13 question on that, because I was going to ask about  
14 that, Bill. So then it doesn't take into account the  
15 transformer's capacity?

16 MR. BOYCE: It took account the transformer  
17 capacity, not only that, but what the transformer was  
18 loaded up to. So we took a look at how much capacity  
19 head room and then we would take a look at our  
20 impacts as cars attached to the grid, because if you  
21 look it's, you know, increasing more cars every year.  
22 You're going to cause more impacts every year.

23 But if you could spread it out across time,  
24 like I said, not have any two cars or three cars  
25 charging at the same time. So if you ever look at

1 our research and development, we're always looking at  
2 how can we potentially have cost mechanisms send out  
3 pricing signals, or other types of ways to sequence  
4 the cars so, once again, they're not charging on top  
5 of each other.

6 MR. CRISOSTOMO: And this is a 2030 figure?

7 MR. BOYCE: That is what we're projecting.  
8 It's not quite year to year. I had to fudge up an  
9 old chart in order to get it for you this quickly.

10 MR. CRISOSTOMO: All right.

11 MR. BOYCE: But it tries to quasi make it  
12 think about 2030.

13 MR. CRISOSTOMO: We appreciate that. Thank  
14 you. Any clarifying other points? Okay. Next,  
15 Kapil from BWP.

16 MR. KULKARNI: Commissioner Scott,  
17 Commissioner Peterman, Noel, thank you for the  
18 invitation to participate in this panel. Kapil  
19 Kulkarni, Burbank Water and Power. I'll be  
20 presenting on our Transportation Electrification  
21 effort so far.

22 Next slide. First, just an overview of what  
23 I'll talk about and how they address the Draft  
24 Guidelines. Going through each of the sectors that  
25 we work in currently, what we currently offer in

1 terms of incentives and how we plan to do the  
2 marketing portion, as well.

3           Next slide. first, a little bit about  
4 Burbank, Southern California based, about 10 miles  
5 northwest of downtown L.A. Population of 105,000 in  
6 17 square miles. What we've done over the last  
7 couple years, we received a Smart Grid Grant from the  
8 Federal Government and were able to deploy full MI  
9 for both electric and water in the territory.

10           So the benefit from that is knowing, you  
11 know, what our load is in any given year on a 15-  
12 minute basis. We also as part of that installed our  
13 first public EV chargers through a charge point in  
14 2011, and then expanded the Public Charger Program  
15 with Greenlots and our curbside chargers of a CEC  
16 grant a couple years ago.

17           At the same time, we wanted to make sure  
18 that we were addressing other parts of the EV  
19 charging market. So we implemented time of use rates  
20 for residential customers and rebates for the  
21 purchase of electric vehicle chargers.

22           So that's been our public and residential  
23 program so far, but the thing that we need to address  
24 within the city, as you can tell by the map, are the  
25 employment sectors. You know, Burbank is a -- has a

1 vibrant commercial sector in terms of it's 75 percent  
2 of our total electric load, and it's a net I guess  
3 producer in terms of jobs and commuters.

4           We have a couple big studios, as well as  
5 production facilities, and this brings in more cars  
6 during the day than leave. So we have cars that are  
7 parked there throughout the day during the daytime,  
8 and it's -- you know -- because Burbank is still  
9 somewhat suburban, you need a car to get around the  
10 city. So there's a high potential for workplace  
11 charging.

12           Next slide. As you can see by this graph  
13 here, which is a little complicated to explain, but  
14 basically, this is actual load data. The orange  
15 graph, which is non-solar load, and the top blue  
16 graph, which is solar load, for November 2015,  
17 weekday.

18           So you can see the kind of gap between solar  
19 and non-solar resources, and this is mainly as a  
20 result of the RPS and one of our solar resources,  
21 Copper Mountain, which came online in the last couple  
22 years.

23           So that's a 40 megawatt difference that we  
24 need to absorb into our system, and we think that we  
25 can do that with the addition of workplace charging,

1 as represented by the middle line, which is non-solar  
2 plus EV load.

3 But when you -- so this is one possible  
4 solution for addressing the imbalance between solar  
5 and non-solar resources. But at the same time the  
6 bottom and top lines are real. The middle line is  
7 kind of a stylized version of workplace charging.

8 It's actual workplace charging data scaled  
9 up by a factor of about 20,000. So that's not going  
10 to be next year or the year after, but probably maybe  
11 10, 15 years from now. And it's based on, say, an  
12 average of one kilowatt per vehicle, charging  
13 starting around 7:00 or 8:00 o'clock, and hopefully,  
14 not charging between our peak hours of 4:00 and 7:00  
15 p.m.

16 So you know, we have some workplace charging  
17 data available from our internal Workplace Charging  
18 Program, but to acquire this data for the commercial  
19 companies and studios in Burbank there is a cost to  
20 get that data, because it's their customer data and  
21 it's behind their meter.

22 So we don't currently have any EV load that  
23 is separately metered. You know, we can look at our  
24 AMI system to figure out, you know, what might be  
25 occurring from charging, what might be occurring from



1 air-conditioning, but we have plans to hopefully  
2 start a pilot program that will separately meter EVs  
3 and provide level one workplace charging.

4 But you know, currently, you know, we have  
5 as much data as you guys have from us, which is to  
6 say, very little. So there's a cost to get this data  
7 and we hope to work with our commercial customers to  
8 help us inform what our program should look like, as  
9 well as inform our IRP and work with the CEC on that.

10 Next slide. So that addressed Part B of the  
11 Guidelines. The next slide is our current rate  
12 design for commercial customers. Right as of January  
13 1st, 2017, all of our commercial customers, which is  
14 all -- or 75 percent of our load, is on a time of use  
15 rate.

16 Fortunately for them, they haven't hit the  
17 summer portion of it to where they'd be paying 26  
18 cents between 4:00 and 7:00 on summer weekdays, but  
19 it's something that we're working on in terms of more  
20 marketing and outreach to make sure that they're not  
21 surprised when they get their July bill with their  
22 June usage.

23 So this addresses number two of the  
24 Guidelines in terms of rate design to encourage  
25 electrification and making sure that we can

1 incentivize charging, whether we want it off peak or  
2 mid-peak, as well as, you know, potentially super off  
3 peak.

4           And this kind of goes back to the points  
5 that Tom and David addressed in the previous panel,  
6 and Bill had mentioned with the flat rate. We do  
7 have a time of use rate on our own publicly-owned DC  
8 fast charger, but the time of use rate, which is 50  
9 cents during those peak hours and 30 cents during  
10 non-peak hours, has not had an impact on usage of the  
11 charger.

12           Based on what other panelists have said,  
13 it's like a gas station, if you need to go somewhere,  
14 you're going to use it regardless. And that's also  
15 not very customer friendly in terms of in the winter  
16 they pay 17 cents during the non-peak hours and 30  
17 cents in the peak hours.

18           So you know, it's not easy for us to change  
19 the rates of the charger every time the season  
20 changes, and it's not convenient for the customer to  
21 think about, oh, should I wait until, you know, after  
22 7:00 to charge if I need to go somewhere now. So I  
23 think we'll look more into flat rates and making sure  
24 it's easier for the customer to pay for not only the  
25 demand charges, but also the kilowatt hour usage.

1           Next slide. So based on the graph, which  
2 showed the solar and non-solar resources, we plan to  
3 do a lot of efforts with our key accounts and other  
4 commercial customers, to meet with them, find out  
5 what needs they have for charging, what they're  
6 currently doing and see what options make sense.

7           You know, if there are other ways to roll it  
8 onto AQMD compliance or other benefits to employees,  
9 then we can do that without necessarily building the  
10 infrastructure for them or providing rebates that  
11 we'll have no way of tracking if the usage is behind  
12 the meter.

13           But if we can work on something that  
14 provides, say, a super off peak rate, provides level  
15 one charging and does it as a very minimal cost to  
16 where we can track a usage or shut it off, you know,  
17 during the peak times or during outage times, then  
18 that's something that we can develop a program that's  
19 tailored to those customers.

20           Next slide. For the non-commercial sector I  
21 think it's a little more straightforward in terms of,  
22 you know, time of use rates for residential charger  
23 rebates that are mandatory to go on the time of use  
24 rate, and also, thinking about other incentives.

25           There's a startup that I've heard about that

1 is kind of like Tinder or one of those apps where you  
2 can be matched with another charger in your  
3 neighborhood, so you don't have to install a charger  
4 and you can reserve a time to charge there.

5 For multi-family I think this is something  
6 that it is half of our residential customer base, but  
7 it's something that we haven't really been able to  
8 address, other than through curbside charging. Right  
9 now, we offer them a \$1,000 rebate.

10 And I'll give you zero guesses as to how  
11 many applicants have applied for that, which is zero,  
12 basically, because it's hard for the landlord to  
13 justify putting that in at their expense when they're  
14 not sure if their tenants are going to use it.

15 At the same time, it may be in the thousands  
16 of dollars for a tenant to have a separate meter or  
17 outlet put into the garage for an EV charger. So  
18 definitely, more analysis is needed there. Next  
19 slide.

20 One thing that we have been able to do that  
21 addresses number four, outreach and education and  
22 coordination, and this just happened about 10 days  
23 ago. The picture is from an event that L.A. did  
24 using the same vendor, which I stole for this, but I  
25 wasn't able to get a picture of the actual event.

1           But it was two weekends ago at the Rose Bowl  
2 in Pasadena, jointly sponsored by Burbank, Glendale  
3 and Pasadena Water and Power through a SCPPA  
4 contract. So we were able to utilize Joint Power  
5 Authority resources and bring the benefits of three  
6 utilities working together to have 27 EVs on display  
7 and more than 490 guest drives.

8           And this type of event really brings home  
9 the fact that, you know, in our industry, you know,  
10 it's easy to tell -- to talk to each other about EVs  
11 and the benefits of them. Whereas, for people  
12 attending this event it may be the first time they've  
13 been exposed to it. So we need to do more of these,  
14 and we plan on doing it with the help of SCPPA.

15           The next one, just going through all of the  
16 different actors involved in, you know, vehicle data,  
17 charger data, rate data, operations data and planning  
18 data. And one thing I wanted to kind of address, my  
19 background's in energy efficiency.

20           Energy efficiency usually results in a lower  
21 than one RIM test. Whereas, if you're putting in  
22 chargers and adding vehicle load that results in a  
23 RIM ratio of greater than one. And this is something  
24 that we have to explain to our policymakers and  
25 customers, because a lot of them still think of these

1 as being, you know, toys for rich people.

2           So we have to do a better job and I think  
3 the state can help us on that. And then finally, the  
4 last slide, you know, kind of a summary. More  
5 commercial sector outreach, instead of 75 percent of  
6 our load.

7           Innovations, startups, you know, working,  
8 you know, continuing to work with the private sector  
9 actors to make sure that we can introduce those  
10 innovations into our territory, and then more return  
11 on investment of our investments.

12           And then kind of a bullet list of things  
13 that -- additional things. So you know, you saw  
14 Bill's graph, which is something that SMUD can do.  
15 We are not at the point yet to be able to quantify  
16 that, and probably none of the smaller POUs at that  
17 point yet, but I think that could be something that  
18 we would want to get to in a couple years, as well as  
19 the DACs, which are in Burbank, but not as numerous  
20 as maybe other territories, as well as addressing  
21 medium and heavy duty sectors. Thank you.

22           MR. CRISOSTOMO: Thanks, Kapil. And for the  
23 record, the application that you're referring to is  
24 called EV Match, aptly named. Next to John,  
25 Jonathan, from NCPA.

1           MR. CHANGUS: Great. Thank you. And yeah,  
2 it's always a pleasure to hear from some of the non-  
3 NCPA members so I can learn about Tinder apps for EV  
4 charging. It's exciting stuff. Commissioners, thank  
5 you for inviting us here and having this  
6 conversation.

7           I very much appreciate both the joint agency  
8 approach, having folks from across the board  
9 involved. And really appreciate, as well, kind of  
10 Staff's prepping for this conversation. It's really  
11 more about what can we do together going forward.

12           And that's a really refreshing response to  
13 hear about how we're going to focus first and  
14 foremost on collaboration. And it's a continuation  
15 of conversations. Commissioner Scott, you were  
16 gracious enough to meet with some of the NCPA  
17 members, in which we shared much of what we will  
18 probably start to continue to include in the IRPs, as  
19 far as what other programs we're pursuing.

20           How are we tackling Transportation  
21 Electrification in its very many forms in specific  
22 communities? And how are those different or are they  
23 the same? We benefit a great deal from some of the  
24 forerunners, such as SMUD and Burbank and LADWP and  
25 learning from their experiences.

1           And so as we go forward there's a lot we  
2 could talk about on Transportation Electrification,  
3 but trying to be responsive to the requests today and  
4 the proposals before us. I think there's -- it's  
5 kind of a couple of points we want to hit on, and  
6 we'll follow up on with -- and written comments, as  
7 well.

8           Just first and foremost, the end goal of  
9 market transformation is going to take utility  
10 programs and a great deal more. It's going to take  
11 your guys' combined efforts. ARB has a variety of  
12 programs through ZEV to affect both vehicle and fuel  
13 carbon intensity in ways that we can change that.

14           And much the same as building and appliance  
15 standards on energy efficiency are important, so are  
16 those ARB programs kind of critical to the market  
17 transformation. There are incentive and funding  
18 source programs.

19           You heard from a number of POUs that were  
20 able to move forward with charging infrastructure  
21 only because of state and/or federal funding to help  
22 make those projects happen. And we'd like to, you  
23 know, continue to build, right.

24           We're not starting from scratch. It's not  
25 like we're going to start collaborating. We've been



1 collaborating for a very long time and this is the  
2 next iteration of that broader discussion. And so I  
3 think it's, you know, very appropriate that as our  
4 program starts to mature, in all candor, as we heard,  
5 NCPA members are, especially IRP utilities, are  
6 bringing up to speed some of their programs.

7           They have not done quite as much of the  
8 research as perhaps SMUD or LADWP some have, and  
9 that's a reflection of just kind of the natural EV  
10 market that's already occurred. Right now, we're  
11 being much more intentional, and that's going to  
12 manifest itself going forward.

13           And so I think there's a recognition that  
14 it's appropriate for us to be providing additional  
15 information to the state agencies, policymakers, so  
16 you're informed as far as what we're doing.  
17 Hopefully, not just to make sure, are you doing what  
18 you need to kind of to get to 40 percent, but also in  
19 a manner of, okay, well, how are we doing at the  
20 publicly owned utilities match and align with what's  
21 going on at the state level.

22           What are the other local sources and how do  
23 we make sure we're all, you know, oars in the water  
24 together? And that's difficult. There's a variety  
25 of different programs trying to take different bites

1 at this apple.

2           And so it is going to take a great deal of  
3 not only agency coordination, but stakeholder  
4 coordination, as well. And so our hope is that the  
5 IRP is part of a way that we can contribute to that  
6 coordination.

7           I think with the specific system of the  
8 data, and we'll get into greater detail in our  
9 written comments as far as what's being requested. I  
10 think with the high level we recognize the need to  
11 provide perhaps information that's not collected  
12 today.

13           There is going to be a degree of ability  
14 that differs amongst utilities as far as how granular  
15 we can get to. And I think it's really important to  
16 be clear as far as there's going to be changes to the  
17 IEPR forms, supply and demand, related to  
18 Transportation Electrification.

19           There is proposed changes or additional  
20 information in the IRP. There is going to be low  
21 carbon fuel standard data that's collected. There's  
22 going to be cap and trade allocation data that's  
23 collected.

24           To the extent we're collecting data, let's  
25 try and make sure it's as similar and consistent as

1 it can be. We anticipate EIA at some point, as well,  
2 is going to have a form that's collecting this data.  
3 And so in the spirit of report streamlining, which  
4 the Chairman has heard us speak to a great deal  
5 about, it would be really useful to make sure we're  
6 not duplicating or creating new efforts solely for  
7 IRP.

8 I get -- the qualitative data I think is  
9 really useful. I helped prepare an energy efficiency  
10 and a rooftop solar report that we intentionally go  
11 well beyond just the quantitative data, because you  
12 don't get a feel for a POU community if all you're  
13 looking at is a spreadsheet.

14 You need to hear their voice, and we welcome  
15 the opportunity to share that. So I think there's a  
16 lot within the Guidelines that jive with what we're  
17 trying to do. We just would like to avoid  
18 duplication if at all possible.

19 And you know, Barry touched on a point that  
20 I think is, as we all go forward and really important  
21 to keep in mind, is that what we're trying to do is  
22 EV adoption early on. There's some things with  
23 vehicle to grid integration.

24 There's some more advanced practices and  
25 uses of EV charging in the future, but at the --

1 right out the gate it's, you know, a lot of it's  
2 residential charging. What can we do to just get  
3 people to make the transition from a gas to an  
4 electric vehicle.

5 And then there's, okay, so how much data can  
6 we collect along the way about that. And it's trying  
7 to figure out, is EV adoption first and foremost the  
8 concern, or is it the data collection effort?

9 They don't have to be mutually exclusive,  
10 but at some point if we get too far down on the  
11 granularity and we want everybody to have the same  
12 data, it may be something, especially for the smaller  
13 utilities where we're spending more time just trying  
14 to figure out, can we collect this data, versus, what  
15 are the programs and services we really need to be  
16 offering.

17 So we'll get into a bit more detail on the  
18 specifics. I'm happy to answer any questions, and  
19 again, thanks and we look forward to continuing the  
20 conversation.

21 MR. CRISOSTOMO: Thanks Jonathan, and then  
22 to close us out for the POU's, before we get into  
23 discussion, Bryan.

24 MR. COPE: Commissioners, thank you very --

25 MR. CRISOSTOMO: Your mic isn't --

1           MR. COPE: Oh, I thought the light was on.  
2 Thank you. Again, Noel, thank you very much.  
3 Commissioners, appreciate the opportunity to be here.  
4 Bryan Cope, Program Manager for Southern California  
5 Public Power Authority.

6           I can make this really short. I could just  
7 say, I support everything these guys said, because  
8 everything Nancy said and the rest of the panelists I  
9 fully support and endorse. But I would like to  
10 expand on a couple things in response to things that  
11 -- one thing that Commissioner Peterman said at the  
12 very beginning, that Jonathan alluded to, was  
13 collaboration.

14           And I think that's really important because  
15 if we don't work together we're not going to get to a  
16 common goal, and I think we have a common goal. I  
17 think all the utilities in the room agree and  
18 understand the importance of Transportation  
19 Electrification, and we support that fully.

20           I have the pleasure of helping all of my  
21 members, or all of SCPPA members develop programs,  
22 including Transportation Electrification Programs,  
23 and L.A. and Burbank are just a couple examples. All  
24 of our members are developing programs to different  
25 degrees and levels.

1           Unfortunately, not all the utilities have  
2 the proper metering infrastructure to develop time  
3 and use rates. And a lot of people will say, yeah,  
4 we need time and use rates and that'll solve a lot of  
5 the problems.

6           There's a cost to that and people don't  
7 really recognize that all the time, that if you want  
8 to go to time use rates, it's going to require an  
9 additional cost. So there are some considerations  
10 that need to be made in that regard.

11           Also regarding Noel's request to make sure  
12 that the Guidelines include a suggestion that  
13 utilities should be leveraging additional funding,  
14 and I want to make sure that you recognize SCPPA was  
15 one of the early implementers of a CEC grant.

16           We installed 16 chargers in southern  
17 California along the corridors, 90 C fast chargers  
18 and seven level twos. And we were very successful  
19 and I thought that partnership was an ideal  
20 opportunity for us to collaborate, and I think it's a  
21 good example of how we can work together.

22           Other than that, you know, I think what's  
23 really important is the members all have different  
24 needs. Kapil's going to be focusing on workplace  
25 charging. A lot of our other utilities have 50

1 percent or more residential customers.

2           So they're going to be focusing on  
3 developing residential charging to get a lot of the  
4 charging at night for the grid value. So you know,  
5 it's -- I think a couple of different people have  
6 said it. Not one size fits all.

7           So each of the different utilities are going  
8 to require different programs to meet of the  
9 communities that they serve. So Dave and Tom were  
10 talking about, I'm going to kind of -- I don't have  
11 the numbers like Kapil did in the Guidelines, but I'm  
12 going to jump around a little bit here.

13           The market is changing very fast and we need  
14 to recognize that. No, that's okay. Thanks. And  
15 you know, part of that is you got to be recognized by  
16 the Commission Staff going forward. Particularly in  
17 this first round of the IRP development for many of  
18 the utilities is that a lot of the data that's being  
19 asked for, you know, it's on point.

20           The things that -- the data that you're  
21 suggesting be included, it's accurate and correct,  
22 but it's not available for everybody. And you need  
23 to recognize, to Jonathan's point, I think the IRP  
24 submittals this year could be more qualitative than  
25 quantitative, and you're going to see increasing

1 amounts of quantitative data be made available in the  
2 coming years, months, but it's maybe not right there.

3           It's not there right now and I just hope  
4 that we can work together to expand on that data  
5 availability going forward, rather than get all upset  
6 if we don't give it to you right now, because it's  
7 hard to give you what we don't have. That's just a  
8 thought in that regard.

9           Barry made a good point at the beginning  
10 about, this is customer driven, and I think what's  
11 really important for the Commission to remember is it  
12 needs to be simple for the customer to increase  
13 adoption. And I think working together we can get  
14 there.

15           The last suggestion that Noel had -- I think  
16 Noel's slides closed out on, what can the Energy  
17 Commission do to help us help you, and I've got three  
18 or four ideas, if you don't mind. First would be  
19 it's been clearly supported by the panelists all  
20 through the day is that incentives are needed, both  
21 for infrastructure development and cars.

22           The Energy Commission and the State of  
23 California I believe have a direct impact on the  
24 ability to install infrastructure for utilities and  
25 in the private sector, and also for people to be



1 incented to by -- purchase electric vehicles. So  
2 that's an important strategy going forward.

3           The other point is, the state has access to  
4 EV data from the DMV that isn't necessarily available  
5 to the utilities, and we would encourage the  
6 Commission to work with the state to, as Kapil  
7 suggested, periodic EV data updates and potential  
8 forecasts to extrapolate out the existing data to see  
9 where we're going, because a lot of the utilities  
10 don't have the band width or the capacity to develop  
11 their own internal forecast.

12           So if they've got something to start with  
13 that's a very helpful opportunity. And another  
14 related working with California Department, would be  
15 I would encourage the Energy Commission to continue  
16 to work with the PUC and CARB to develop estimations  
17 for GHG so that everyone's working with the same data  
18 points, rather than guessing at it, what your own  
19 utilities' greenhouse gas impacts could be.

20           And lastly, I'm going to go back to the --  
21 another point that I've made in energy efficiency  
22 related issues, is that if the Energy Commission and  
23 the state really wants to endorse electrification of  
24 the transportation sector, I really would believe  
25 that the state could take a stronger role in

1 education and outreach for people in the state.

2           It worked for the drought. The state came  
3 on board and said, hey, you guys need to save a lot  
4 of water because we're in a bad drought situation.  
5 If you really want to reduce greenhouse gases through  
6 electrification, same kind of public outreach and  
7 advertising program could be an effective way to get  
8 that message out and would help support all the  
9 utilities' efforts.

10           And lastly, I just want to make sure that we  
11 aren't reliant solely on utility programs to reach  
12 the electrification goals. I think one of Noel's  
13 points was that the utilities are critical, and I  
14 don't disagree with that.

15           But at the same time, we also need to be  
16 reliant on the private sector to get utilities, the  
17 private sector and the government working together  
18 and collaborating to a common end goal. And with  
19 that I can close out the POU statements. Thank you.

20           MR. CRISOSTOMO: Thank you, everyone. Any  
21 initial, quick responses before we get into the  
22 discussion for 15 minutes?

23           COMMISSIONER SCOTT: Well, no. I'd like for  
24 us to jump into the discussion, but I do appreciate  
25 the thought and care that you have put into the

1 comments that you brought for us here today, and I  
2 really look forward to seeing the additional comments  
3 in writing. I don't know if Commissioner Peterman's  
4 got some questions.

5           COMMISSIONER PETERMAN: I have a few  
6 questions, and perhaps I will just say what they are,  
7 and if they can be answered as a part of the dialogue  
8 that you're planning to have, that would be great.  
9 Thank you very much for the presentations. It was  
10 very informative for me to understand what's  
11 happening with the POU's and how y'all are thinking.

12           One just gets to the last set of comments  
13 around data collection or the availability of data,  
14 and that's something that we're looking at, as well.  
15 And I'd appreciate if you could identify for me what  
16 are some of the data points that you think won't be  
17 available immediately for the first IRP that you were  
18 mentioning. So that's one.

19           Two, and then kind of related to that, is  
20 there anything that can be done to support -- further  
21 support data collection. You mentioned incentives  
22 for vehicles, but are there incentives for any type  
23 of data collection development system, software, et  
24 cetera. So that's one.

25           The second is, I'm very interested in

1 understanding what you see as the ideal end state for  
2 POU engagement with Transportation Electrification.  
3 It was mentioned that not all POUs have invested in  
4 meters to do time of use pricing.

5           Is that expected to happen or are you  
6 envisioning a world where we will always have a set  
7 of POUs that don't have time of use capable meters?  
8 Are you envisioning an end state where we eventually  
9 will have vehicle grid integration and bidirectional  
10 power flow between the vehicles and the grid, because  
11 that's the end state we're envisioning for the IOUs.

12           And so it's helpful for me to understand if  
13 it's a matter of timing, or if it's really just a  
14 different vision of what the utility role will be.  
15 And then my third question gets to IOU and POU  
16 coordination.

17           You talked about a customer centric approach  
18 which I fully agree with. And so you have your  
19 customer who on a very exciting day may travel  
20 through Burbank and LAWP and Edison territory in a  
21 short period of time.

22           And so I'm really interested -- and again,  
23 it gets to that in-state question about, what will be  
24 similar, what will be different about a driver's  
25 experience through those utility service territories.

1 So most immediately, if you can speak to what type of  
2 coordination you're already doing with the investor-  
3 owned utilities on Transportation Electrification, or  
4 where you see yourselves coordinating over the next  
5 couple years.

6 MR. COPE: All right. Thank you. The very  
7 first point I can speak to directly. In 2012 we,  
8 SCPPA, sponsored a request for proposals in  
9 association with Edison International. That was  
10 initiated from Ron Nichols, who at the time was  
11 general manager of LADWP.

12 And we at that time, we decided we needed to  
13 work collaboratively to understand the opportunities  
14 in the electric vehicle market in southern  
15 California. So we commissioned a study that was  
16 actually performed by a consulting firm we acquired  
17 through an IRP.

18 And it was very successful, which led to the  
19 Electric Vehicle Working Group, which I chair for  
20 SCPPA and is participated by all of our members. So  
21 we a long time ago recognized, Commissioner, the  
22 importance of working with the investor-owned  
23 utilities.

24 Their rate structures are different than  
25 ours and their business models are different, but

1 they have the same intent and the same end goal. The  
2 end state there I don't think is too drastically  
3 different from them and from us.

4 I think the speed at which we get to that  
5 end state is probably a little bit different, and I  
6 think that speed is going to vary between utilities.  
7 I think L.A. and SMUD are at this point, and there  
8 are others along an exponential growth curve to catch  
9 up to that, but I think they'll all get there  
10 eventually.

11 I don't think that it's unreasonable to  
12 think that even the smallest POU's eventually will  
13 probably need to have time and use rates, but it's a  
14 cost issue of how soon can you afford that. And so I  
15 think that summarizes that end state question that  
16 you were getting at.

17 I think ultimately California utilities in  
18 general will all probably end up somewhere very  
19 similar.

20 COMMISSIONER PETERMAN: [Is the Southern  
21 California electrification work group still] going?

22 MR. COPE: It is. We meet monthly. We have  
23 a regularly scheduled meeting every month, and we  
24 meet on an ad hoc basis, as we need, for special  
25 presentations, so.

1           MR. CRISOSTOMO: So it looks like we have 12  
2 minutes. And thank you, Commissioners, for your  
3 questions so that I can manage our time to chunk out  
4 the questions that we have around forming better,  
5 more effective IRPs.

6           I want to draw a connection to what our  
7 previous panel on DC fast charging were talking about  
8 in terms of taking care of customers. That's clearly  
9 a connection in terms of improved service and meeting  
10 them where they are, providing them what they need.

11           One of the interesting things around data  
12 gathering in terms of the connectors that we've  
13 deployed or the kilowatt hours from the charting  
14 station standpoint to the vehicle standpoint to the  
15 meter standpoint is understanding the load shape.

16           That's probably one of the most basic things  
17 that some utilities might have, if they have EMI or  
18 separate meters, or not. And so I guess I'd like to  
19 hear a variety of perspectives on how we can work  
20 with either the charging provides or the OEMs or with  
21 the AMI systems or other approaches to gather that  
22 really kind of basic unit of information.

23           MR. CHANGUS: Happy to kick that off.  
24 Jonathan Changus, with NCPA. I think also to just  
25 kick -- with regard to the smart meters and when

1 they're coming, I don't see it being an interminable  
2 future where it doesn't make sense.

3           It's a customer information system, a meter  
4 down to management system, an AMI rollout, which for  
5 small, midsize utilities, is a lot to undertake all  
6 at one time. And so for the purposes of IRP those  
7 utilities are in -- are on track. There's a plan.

8           And so I don't think it's going to -- now,  
9 Biggs and Gridley on the other hand, it's a different  
10 track for the IRP utilities. I think that that will  
11 be available here and in coming years. What will not  
12 be available is meter-specific.

13           You know, with public charging there is  
14 potentially for separate metering, but for  
15 residential charging for the purposes of low carbon  
16 fuel standard, there's an estimation methodology  
17 that's used currently.

18           And so if we're trying to get more granular  
19 than that, there's just -- it's not there yet. So  
20 those are the types of things that we won't be able  
21 to get meter level. Can we provide an estimation  
22 similar to what we did for low carbon fuel standard?  
23 Absolutely.

24           So that's where the consistency and  
25 understanding the different granularity. To working



1 collaboratively with some of the other folks as far  
2 as about the sharing of data, you know, that's  
3 potentially a more complicated question, depending  
4 on, you know, how open data it is.

5           And maybe I'll let some others that have had  
6 direct experience with different third party charger  
7 share. I don't know if I'm answering the question  
8 directly. Maybe you could reframe it again. What  
9 exactly in the IRP you'd like to see from us?

10           MR. CRISOSTOMO: I know through some of our  
11 investments in the RFETP there are data collection  
12 opportunities that are going to be set up with  
13 different EVSPs where they might be reporting some  
14 usage information that could be helpful for load  
15 shaping.

16           I know Kapil is looking for an opportunity  
17 to create a commercial load shape. Did I understand  
18 that right?

19           MR. BOYCE: Let me jump in here. In nuts  
20 and bolts, one of the real issues is there's a lot of  
21 variability across all the different charging. For  
22 instance, I think pretty much like what Tom Ashley  
23 was showing earlier was free charging, DC fast  
24 charging in Los Angeles. All that was free.

25           So people are charging before work and after

1 work. Things like SMUD with our DC fast charging  
2 where we do have a fee, we tend to see a lot of  
3 charging right at noon. People come in, charge  
4 around on their lunch hour.

5 We actually get about eight or nine charges  
6 a day. There's other things I see downtown where  
7 level one charging's free. Level two has got a fee  
8 and nobody charges level two. It's all -- so there's  
9 still a lot of those types of market effects that  
10 make it really hard to categorize load shapes in kind  
11 of a macro sense.

12 And I think, you know, one of the things you  
13 want to think about as a Commission are those  
14 different types of things. How much free charging's  
15 going on at workplace, you know, that type of stuff.  
16 Also, if you think about it, free workplace charging  
17 really helps fill the belly of the duck curve.

18 You don't have to do anything more than just  
19 put it out there and you start filling the belly of  
20 the duck, with or without pricing signals. The other  
21 one is, at SMUD we have a flat employee fee. They  
22 pay \$10 a month, essentially. It's \$5 a pay period,  
23 but it fills up that belly of the duck just because  
24 it's there.

25 But anyhow, I would suggest you really need

1 to try to characterize some of those big things, like  
2 free versus nonfree, estimations, all that have a  
3 huge impact on the overall load. When I think about  
4 things like an IRP, how are you going to match this  
5 up, you know. Do you need fancy control systems or  
6 do you just set really different rates that motivate  
7 people financially.

8 People are pretty motivated financially in  
9 this electricity than I see in any other type of use;  
10 really interesting.

11 MR. CRISOSTOMO: I guess to keep the ball  
12 rolling I want to kind of pose that question back to  
13 the other panelists. Do we need really highly  
14 granular, extremely characterized, segmented  
15 information? Or how would you approach that?

16 MS. SUTLEY: At least I think the way that  
17 we approached it our IRP, it's a planning document  
18 and that's a lot for us focused on strategies or on  
19 where we going to be in 20 years. And I think one of  
20 the primary drivers for LADWP is greenhouse gas  
21 emission reductions.

22 And so trying to insure that we're, you  
23 know, meeting our customers' needs going out 20 years  
24 and also able to sort of optimize, I guess, for lack  
25 of a better word, our greenhouse gas emission

1 reductions goals, that's -- I think we're -- as we  
2 looked at different scenarios in different cases in  
3 our IRP, that's really the difference, is what's the  
4 best way to achieve our greenhouse gas emission  
5 reduction goals, because we're going to serve our  
6 customers' load, and no matter what.

7           One other thing I just wanted to add on the  
8 previous question is we -- you know -- we were the  
9 cosponsor of a large smart grid demonstration project  
10 with the Department of Energy, which concluded last  
11 year. It was Recovery Act money.

12           We put in half. DOE put in half, and a big  
13 chunk of that was around a lot of research at  
14 universities, USC and UCLA, around integration of EVs  
15 and a whole set of research projects around sort of  
16 pricing structure and incentives, rate incentives and  
17 things like that.

18           So there's a lot of information around the  
19 results of that project that might be interesting.

20           MR. KULKARNI: Yeah. For us, when you talk  
21 about the load shapes, I've had to -- you know -- in  
22 some of the discussions I've had with our internal  
23 IRP team, I've had to tell them what the load shapes  
24 are just because it's so minimal that they have --  
25 they don't see the impact of it.

1           And I think that that'll probably change  
2 over time, but you know, especially as we add more in  
3 place charging, but their main concern is balancing  
4 non-solar and solar resources, and managing load. So  
5 and also, we have basically three data collection  
6 systems for our EV chargers, one with ChargePoint,  
7 one with Greenlots for the public chargers -- or each  
8 of them with public chargers, and then our meter data  
9 management system for I guess meter data.

10           And for residential we see that the time of  
11 use rate really does have an impact. People start  
12 charging at 11:00 and when it's eight cents per  
13 kilowatt hour and they don't typically charge during  
14 the day.

15           But for commercial and workplace they may  
16 not be charging that much until we institute  
17 something like super off peak to where it comes out  
18 to say five bucks a month or very minimal costs. So  
19 I think that'll be one of the steps that we try and  
20 gather more data on.

21           MR. CRISOSTOMO: Bryan, did you want to get  
22 in and say something?

23           MR. COPE: I think Kapil's point is that --  
24 is spot on. The data points aren't big enough to  
25 really be too big of an impact right now. But like I

1 said earlier, in the coming years it will continue to  
2 grow, but I don't think that you do need a granular  
3 breakdown of what the load shape is, per se, right  
4 now.

5 MR. CRISOSTOMO: So that kind of leads into  
6 maybe a final question with another go round, to  
7 Bill's point about the potential for intelligent  
8 smart charging to reduce cost. One of the specific  
9 additions to the IRP Guidance was the inclusion of  
10 cost data.

11 And to work the theme of the diversity of  
12 the POU's it's going to be difficult to compare a  
13 transformer upgrade or a substation upgrade  
14 associated with the EVs across all -- more than a  
15 dozen of the reporting POU's.

16 Are there ideas of how we could best  
17 quantify those infrastructure costs consistently? Or  
18 how do you collect costs right now? Maybe you can  
19 simplify it.

20 MR. COPE: While Bill's thinking about it,  
21 this is Bryan Cope from SCPPA, I really haven't heard  
22 too many examples, Noel, of any of our members  
23 experiencing significant capital outlays for  
24 infrastructure improvements to serve EV load.

25 Yeah, I just -- it's just not coming to me.

1 I don't -- I can't think of too many examples, if  
2 any.

3 COMMISSIONER SCOTT: Yeah. But I think at  
4 least for us it hasn't really come up with respect to  
5 residential or workplace charging. I think where  
6 it's going to come up is in the medium and heavy  
7 duty, both because the chargers are very specialized  
8 and they're very expensive, and then the  
9 infrastructure to bring that.

10 So as we look at, as we're working with the  
11 Port of Los Angeles, for example, or L.A. World  
12 Airports, LAX, those issues I think we're going to  
13 have to address. And we are looking at different  
14 ways to do it, both in terms of this -- how we  
15 provide additional service to our large commercial  
16 customers, and potential using LCFS money and others  
17 to -- other -- to try to fill in some of those gaps.

18 MR. COPE: But just real quick to support  
19 Nancy's position, I think she's absolutely right.  
20 Medium and heavy duty vehicles and ports and  
21 airports, that's where the larger load impact is  
22 going to hit.

23 But at the same time, I don't think  
24 utilities are going to undertake those kind of  
25 infrastructure improvements unless they can cost

1 justify them. You know, if it's going to cost \$1  
2 million to upgrade for -- to build a new substation  
3 for, you know, transit buses so they can all charge  
4 on the same spot, there's going to have to be a \$1  
5 million in value before the utility.

6 You know, be it a societal benefit test or  
7 true just pure economics, the value has to be there.  
8 Otherwise, it can't be justified by the communities  
9 that the utilities are supporting.

10 MR. BOYCE: Yeah. I was going to reiterate,  
11 you know, all of the ones where you've got more of a  
12 commercial application where there's a service  
13 upgrade being made as part of a normal application to  
14 support electrification.

15 You'd have the ability to get that data.  
16 Residential data, all those grid impacts that I  
17 showed you are all modeled, and that type of data is  
18 very difficult to see how it plays out in the field.  
19 You know, if you want to know how we did all that,  
20 it's probably a special, one-on-one presentation that  
21 we can do offline.

22 MR. COPE: Cancel that.

23 MR. BOYCE: Yeah.

24 MR. COPE: And I think the final response  
25 here is, to borrow from distribution resource



1 planning world and some of the more than smart effort  
2 about crawl, walk, run, I think some of the questions  
3 being posed about data that we'll want to collect and  
4 consider, because there will be impacts, are things  
5 to consider in the future.

6 I think right now we just need to get some  
7 base level market adoption up. We need to see more  
8 EVs charging at home and then move out to the  
9 workplace and move to the public. We're at very low  
10 penetrations right now, such that it doesn't make  
11 sense to do a whole bunch of load forecasting for a  
12 lot of at least NCPA members.

13 But that's going to change, especially as we  
14 see the batteries getting larger, the expectations on  
15 charge rates dropping, you know, where the market's  
16 headed, those are the questions we're going to want  
17 to consider.

18 But today, what are EV plans and programs  
19 today, it's about getting people into the seats of  
20 EVs and how, as we, as utilities, can help facilitate  
21 that. And then in the future we hope to be able to  
22 have to answer those questions because there's such  
23 an EV load and there's so many vehicles out there,  
24 but that's not the case today.

25 MR. CRISOSTOMO: Well, I'll close with just

1 a promise to continue working with Staff at the other  
2 agencies to insure that our efforts collecting  
3 information across PUC -- or CEC, PUC and ARB and the  
4 others are helpful, and really want to thank y'all  
5 for your times and thoughts today.

6 MS. RAITT: Thanks. I'd like to invite our  
7 last panel up to the tables, please. Thank you.

8 (Pause)

9 MR. CRISOSTOMO: To Commissioner Scott.  
10 Okay. Everyone wants to take a in-place, don't leave  
11 the room like five-second standing break, just to --  
12 because I benefit from that. I know it's late in the  
13 day and this is the final panel, and thank you for  
14 everyone's attention.

15 So I'd like to provide the context for this  
16 last stakeholder response panel. I'll introduce our  
17 panelists. Unfortunately, the first one who's listed  
18 caught a cold and was unable to attend, Geof Syphers,  
19 from Sonoma Clean Power.

20 Sonoma has been doing some very interesting  
21 work that is crossing transportation and utility  
22 planning with climate action, air quality  
23 improvement, regional transportation planning and  
24 it's general public policy as a county.

25 So we were hoping to have him present on

1 that perspective, but unfortunately, he isn't able to  
2 attend. But we do have diversity of stakeholders  
3 from the environmental, automotive, environmental  
4 justice and consumer perspective.

5           Unfortunately, I don't see Katherine  
6 Stainken, from Plug-In America, but we do have Laura  
7 Wisland, from the Union of Concerned Scientists, who  
8 works on Integrated Resource Plan for UCS. Steven  
9 Douglas, from the Alliance of Automobile  
10 Manufacturers, Beau Whiteman, from Tesla, and Shrayas  
11 Jatkar, from Coalition for Clean Air.

12           So each of them will have just a few minutes  
13 to provide some broad perspectives on what they have  
14 heard today and what they've learned from the  
15 technical panels, and to provide a reaction on what  
16 the utilities are proposing in their preparations for  
17 electrification.

18           So in your responses to the following  
19 question please explain what your reactions are to  
20 the POUs, IRP and TE policies, and what data are you  
21 collecting to continuously improve your efforts to  
22 promote electrification. So we can start with Laura.

23           MS. WISLAND: Okay. Thanks, Noel, for the  
24 opportunity to speak. For those of you who don't  
25 work with me, my name is Laura Wisland. I'm an

1 energy analysis with the Union of Concerned  
2 Scientists out of the Oakland Office.

3 I work on clean energy policy, development  
4 and implementation, and for the past three or four  
5 years we've been doing a lot of in-house work and  
6 research on implications of high levels of renewables  
7 on the grid in California and how to mitigate some of  
8 the challenges we're seeing, a la the duck curve.

9 So I think a lot of the things that I wanted  
10 to say have already been said in terms of the broad  
11 level potential benefits that electric vehicles and  
12 flexible load can bring to the grid and how we're  
13 going to manage the grid in the future.

14 But maybe I should just back up and explain  
15 why I think Noel wanted me to come here today, was  
16 some of the research that we've been doing. And  
17 that's basically taking a look at the duck curve, the  
18 two main categories of challenges we see on the grid  
19 with high levels of renewables.

20 The first one, of course, is the belly of  
21 the duck, so we're going to be in the fortunate  
22 position of having too much clean energy on the  
23 system during times like this, actually, the middle  
24 of the day in the spring when loads are low.

25 And so we do think that electric vehicles

1 could play a very important role in taking advantage  
2 of some of that low-cost electricity. And so I think  
3 the IRP is a really good place for the Energy  
4 Commission to be encouraging the POUs to be thinking  
5 about all the different ways to take best advantage  
6 of that solar electricity and minimize the need to  
7 curtailment while balancing costs, of course.

8           And putting policies in place to encourage  
9 time of use rates and workplace charging may be one  
10 of the most cost-effective ways to optimize for  
11 carbon and costs and grid reliability all at the same  
12 time.

13           One of the things that I'm hearing and I'd  
14 like to actually follow up with some of the POUs  
15 after this is that TOU rates aren't -- it doesn't  
16 seem like so far they're showing up to be a silver  
17 bullet in all cases.

18           And so it could be that we need to think --  
19 we need to not just assume that if we put different  
20 rates in place that everybody's going to switch to  
21 that. There needs to be really good outreach that's  
22 being done by both the car makers as well as the  
23 utilities, so that people have a really clear  
24 understanding of what's going to happen to their  
25 electricity bill when they purchase an electric

1 vehicle.

2           And there also obviously needs to be  
3 adequate available workplace charging. So I was  
4 hearing some of the POUs saying, a lot of our load is  
5 residential. So we don't have as big of a role to  
6 play in promoting workplace charging.

7           And clearly, we all know that encouraging  
8 charging in the middle of the night is better than  
9 encouraging charging during the morning peak or the  
10 evening peak. But asking the question even if you  
11 primarily dealing with residential load, are there  
12 other ways that these POUs can help encourage daytime  
13 charging for their customers, as well.

14           The other thing that we've been looking at  
15 in our analysis of grid impacts of high levels of  
16 renewables is how to meet that evening ramp. And I  
17 think one of the things at a high level we're most  
18 concerned about is that unless we figure out how to  
19 lower the neck of the duck, we're going to be running  
20 gas plants in the middle of the day so that they're  
21 up and ready to go, and meet that evening ramp, which  
22 is going to make the solar curtailment situation even  
23 worse, because the gas is going to be online in the  
24 middle of the day and be crowding out the solar.

25           And so obviously -- and so part of our

1 research has been asking the question, how can we  
2 insure that the gas is not online in the middle of  
3 the day. And obviously, helping make sure that EVs  
4 aren't charging during those peak hours helps to  
5 lower the neck of the duck.

6 But there's also been some discussion about  
7 whether there are opportunities to allow the electric  
8 vehicles to provide certain other grid reliability  
9 services that would reduce the need to rely on gas  
10 plants to provide those services.

11 It may -- and another thing that the  
12 gentleman from SMUD I think implied is that that may  
13 be cost-effective in situations with very high levels  
14 of renewables, but transaction costs may be so high  
15 that figuring out how to use other types of zero  
16 carbon technologies to provide those grid services,  
17 like frequency response, it may be more cost  
18 effective to look at other solutions, rather than try  
19 to aggregate a lot of EV services.

20 I don't think we know the answer to that  
21 yet, and I think that the IRP and the scenarios that  
22 are run in the IRP could be a really good place to  
23 trade off some of the costs and benefits to thinking  
24 about using EVs to provide services like that, as  
25 opposed to thinking about other types of carbon free

1 technologies to provide those services. So I think  
2 I'm going to stop there.

3 MR. CRISOSTOMO: Let's just go around the  
4 table. So Shrayas, or Shrayas. I apologize.

5 MR. JATKAR: Good afternoon. Shrayas Jatkar,  
6 with Coalition for Clean Air. We are one of the five  
7 groups that serves on the Steering Committee of the  
8 California Charge Ahead Campaign, and that campaign  
9 is focused on implementation of Senate Bill 1275 from  
10 a few years ago that not only sets a target and  
11 statute for the number of EVs on the road, one  
12 million by 2023.

13 It also requires that incentive programs and  
14 particularly those at the Air Resources Board funded  
15 with cap and trade revenue, are directed and increase  
16 access to electric vehicles for residents of  
17 disadvantaged communities, as well as low-income  
18 households in the state.

19 And so I'll try to focus my comments really  
20 on that target population of low-income Californians,  
21 including those that live in disadvantaged  
22 communities, according to Cal Enviro Screen. So to  
23 answer the question about sort of a reaction or  
24 response to what I've heard from the publicly-owned  
25 utilities, I think two things.



1           One is we would certainly agree with the  
2 focus on getting more vehicles on the road, that  
3 that's still -- I think there's still a great need,  
4 in particularly, getting more cars on the roads in  
5 terms of within disadvantaged community census  
6 tracts.

7           We've been mostly following the incentive  
8 programs, as I mentioned, at the Air Resources Board.  
9 There are two in particular that provide rebates to  
10 consumers, the Clean Vehicle Rebate Project and one  
11 that is very targeted towards disadvantaged  
12 communities and low-income Californians, and that's  
13 the -- pardon the long name -- but Enhanced Fleet  
14 Modernization Program Plus Up, or EFMP Plus Up, which  
15 is more of a scrap and replace model.

16           And what we found is the program, you know,  
17 it's sort of perhaps obviously, that the program that  
18 is very much directed and targeting disadvantaged  
19 community residents has a high uptake in those  
20 particular census tracts.

21           Whereas, the first come, first serve model  
22 of the Clean Vehicle Rebate Project, or CVRP, the  
23 number of those rebates that are actually going to  
24 residents of disadvantages communities is less than  
25 10 percent.

1           And that's even after the last few months or  
2 almost a year, actually, where we've seen more  
3 income-based criteria that sort of shapes the rebates  
4 that go out from CVRP. There's an income cap in  
5 place. There's increased incentive for low-income  
6 Californians, and still, we see just about seven  
7 percent uptake of CVRP rebates within disadvantaged  
8 community census tracts.

9           So it's not only that some programs are  
10 designed to reach certain populations. I think one  
11 of the reasons that the Plus Up Program has been so  
12 successful is that it's -- there's considerable  
13 effort to actually meet and talk to those residents  
14 that live in disadvantaged communities.

15           And so the amount of resources that are  
16 required is pretty significant. So I think when it  
17 comes to the publicly owned utilities, you know, I  
18 didn't hear, except for maybe SMUD, a real focus on  
19 disadvantaged communities, and you know, there's a  
20 lot more detail we can get into of what that looks  
21 like in terms of the level of effort needed to really  
22 serve disadvantaged community residents.

23           And the last question I'll just touch on  
24 quickly about data that we're looking at, it's not so  
25 much data that was referred to earlier, but I wanted

1 to just point out that, you know, we're also thinking  
2 about car-sharing and sort of alternatives to vehicle  
3 ownership.

4           There are some pilot projects that the Air  
5 Resources Board is funding, but those projects have  
6 not really gotten off the ground yet. As we probably  
7 all know, bureaucracy is still an issue and moves  
8 some of these dollars very, very slowly.

9           So even dollars that were appropriated years  
10 ago have not actually reached the end-users. The  
11 pilot projects in Sacramento and LA for EV car-  
12 sharing haven't really gotten off the ground, and  
13 neither has the Ag Worker Van Pool in the San Joaquin  
14 Valley.

15           So we're very interested in seeing those  
16 programs get going and learning from those programs,  
17 because as much as we want to see cleaner vehicles on  
18 the road, you know, vehicle ownership isn't the only  
19 model to get there.

20           MR. CRISOSTOMO: I know you have a  
21 presentation, so I can --

22           MR. DOUGLAS: Thank you very much. I'm  
23 Steve Douglas, with the Alliance of Automobile  
24 Manufacturers, and just a little background. We  
25 represent, the Alliance represents 12 car and light

1 truck manufacturers, or about 70 percent of the new  
2 vehicle market in California.

3           So I thought what I'd do is tell you a  
4 little bit about what the automakers are doing so you  
5 know where we are on that, and then focus in on what  
6 the utilities, both POUs and IOUs, can do and the  
7 things that are kind of focused for us to make this  
8 ZEV market.

9           So if you'll go onto the -- a couple slide.  
10 I think everyone's aware of what the zero emission  
11 vehicles are, plug-in hybrids, battery electrics and  
12 then fuel cells. And the next slide. And you know,  
13 we do have a mandate. We have to bring so many  
14 electric vehicle or so many electric vehicle credits.

15           So what manufacturers are doing are more  
16 models, more variety, longer range, better  
17 performance, more options, and then aggressive  
18 vehicle incentives, and I'll touch on each one of  
19 these are we go along.

20           If you go to the next slide, please. So  
21 these are all of the ZEVs just from the Alliance  
22 members. These are cars that are available today.  
23 They are high qualify, reliable, safe, fun to drive  
24 cars. They're at the dealerships. They're on the  
25 roads today. And this is just from the Alliance

1 members.

2           There's I think seven or eight others from  
3 non-Alliance members. So there's over 30 zero  
4 emission vehicles on the market. And I just point  
5 out, these are not just all small cars. They're  
6 SUVs. I think there are five SUVs.

7           There are six different all-wheel drive  
8 vehicles. There's small cars, large cars, station  
9 wagons. I didn't even know we made station wagons  
10 anymore, and yet we have one that's a ZEV. So and  
11 then if you'll go onto the next slide.

12           And I wanted to address a couple of myths, I  
13 think. And the first, and you see this in survey  
14 after survey when we do polling, is people say, well,  
15 why don't you want a ZEV and they say, well, they're  
16 too expensive.

17           Well, that's not the case. So what I did  
18 back in February is I just went to Google and I said,  
19 Volkswagen E Golf, lease deals, California. So and I  
20 found the low cost lease deal, and I did that for  
21 each one of these vehicles.

22           And if you see on the far left there the E  
23 Golf, the Focus, the 500-E, the Nissan Leaf, these  
24 are great cars. And so I found the total cost for  
25 CVRP eligible people. So 36 months times the monthly

1 payment, plus the down payment, and then I subtracted  
2 off the CVRP, and there they are.

3           And those bottom four, they're like --  
4 that's like two grand over the course of a three-year  
5 lease. That's 60 to \$70 a month. Sixty or \$70 per  
6 month. That's less than the price of the data plan  
7 for this phone. Doesn't even include the phone.

8           So if you go to the next slide, and as you'd  
9 mentioned, for low-income Californians they get an  
10 additional \$2,000 through the CVRP Program. So it's  
11 not really higher math at a \$2,000 total lease cost  
12 if you give a \$2,000 check, the total cost is zero.

13           You need to go to the next one. If you live  
14 in the San Joaquin Valley, the San Joaquin Valley has  
15 a Drive Clean Campaign, where they give \$3,000 for  
16 battery electric and fuel cells and 2,000 for plug-in  
17 hybrids. So here, you actually make money leasing  
18 these cars.

19           So you know, two to 3,000, you can buy a  
20 bunch of phones with that, with the money you're  
21 making from these. So that's the first one. So they  
22 are available. There's a lot of them available and  
23 there's aggressive pricing.

24           Obviously, this includes the federal rebate  
25 and also includes the CVRP, but the manufacturers are

1 also incentivizing these to a very high degree. So  
2 if you can go to the next slide. So that's what we  
3 have now.

4 And let's talk a little bit about where  
5 we're going in the next few years, and this is by  
6 2021. These are 37 battery electric vehicle models,  
7 and I draw your attention to the right three bars.  
8 So there's 24 different models that have over a 200-  
9 mile range.

10 And that includes four standard SUVs, over  
11 nine small SUVs, large cars, mid-size cars. I mean,  
12 there's just a lot of vehicles coming. So that's on  
13 the battery electric side. If you go to the next  
14 slide, and the same thing on the plug-in hybrids,  
15 over 36, and just, you know, large numbers of SUVs,  
16 large cars, mid-size cars, small cars.

17 And all of these number -- all of this data  
18 I got from ARB, their mid-term review that they  
19 issued at the beginning of this year. So I think  
20 that's kind of the manufacturer's role. We make cars  
21 and the manufacturers, the automakers have invested  
22 tens of billions of dollars to develop these  
23 vehicles, bring them to market, and more are coming.

24 So we'll have twice the number of models in  
25 the next five years. If you go to the next one. So

1 okay. So what about the state and the -- I mean, the  
2 POU and the IOUs, as well, and then state in general,  
3 and the next slide.

4 I think everyone knows California's the top  
5 seller of ZEVs. In fact, they sold more than twice  
6 as many as all of the other states combined. So the  
7 next one. But we're not stopped. We can't just stop  
8 there. So everybody has a target. These are all  
9 targets.

10 They're not regulations or requirements, but  
11 you know, SB 1275 has a million vehicles by the end  
12 of 2022. So that's actually January 1st of 2023. So  
13 that's three times as many vehicles over the next six  
14 years as over the past six years.

15 And then the Governor's Executive Order, the  
16 ZEV Action Plan, that's five times as many by 2025.  
17 And then ARB, not to be outdone, they came out with  
18 their own target. And again, this is a Draft Scoping  
19 Plan with 4.2 million. You've heard that.

20 So there's kind of no stopping. We have to  
21 keep going. We have to keep making progress. If  
22 you'd go to the next one. So what are the priorities  
23 for growing the ZEV market, and these are not in  
24 order of priority for us, but just kind of focusing.

25 The first is simple, low-cost electric



1 charging at home, and also, retail electric charging,  
2 as well, but I don't even go into that because at  
3 least from the IOU level and possibly -- I'm a SMUD  
4 customer, so my rates are pretty low.

5 But if you go to the next chart, this is the  
6 kind of complication, and you can't hope to try to  
7 explain this to a dealer salesman or a dealer, to try  
8 to figure out how much it's going to cost to fuel an  
9 electric vehicle.

10 So there's five different, PG&E time of use  
11 rates. So Cal Edison has four and then there's flat  
12 rate, and most people are flat rate. And if you go  
13 to the next one. So it's complicated. It's  
14 complicated and it matters.

15 You know, it's not like it doesn't matter.  
16 These are the -- so the question is, does it cost  
17 more to drive electric than it costs to drive  
18 gasoline, because that's the second myth, is that --  
19 I see it all the time. It's like, driving an  
20 electric vehicle is like paying a dollar for a gallon  
21 of gas.

22 Well, no, it's not. Most people are flat  
23 rate and these are the gallon per gas equivalent  
24 costs for that. So that's important. So the next  
25 slide. So the low-cost fueling for electric

1 vehicles. And the second thing is, the rates are  
2 really complicated.

3           This is So Cal Edison's rates. So you have  
4 four different plans. You have four different sets  
5 of targeted use. You have peak periods, super off  
6 peak periods, peak rates, off peak rates, super off  
7 peak rates.

8           Monthly, some have monthly fees. Some  
9 don't. Some are tiered. Some aren't. You can't  
10 expect customers or salesmen to figure this out and  
11 try to explain it when you're comparing it to a  
12 gasoline car that you say, 40 miles per gallon and  
13 everybody knows it's 2.50 a gallon of gasoline.

14           So next slide. And this one person did  
15 this. This is how they figured out what's the  
16 cheapest time of use rate. They went hour by hour  
17 for a week in the summer, and this is the So Cal  
18 Edison, and then they had to compare how much  
19 electricity they used hour by hour for a week in the  
20 summer.

21           They did the same thing in the winter.  
22 That's simply too complicated, and what we need is  
23 something that a dealer or salesman could explain in  
24 one sentence, not a, when do you wash your clothes.  
25 Can you do your laundry at night.

1           So the next slide. The next thing is  
2 fueling infrastructure and that's something that many  
3 people brought up today. It's critically important.  
4 Then if you go to the next slide. I mean, we're  
5 behind today.

6           So NREL did a study, and I think everybody  
7 in this room's probably familiar with, but it said  
8 you need about 100 to 200,000 charge points at  
9 workplace and in the public and workplace chargers,  
10 and these are all level two.

11           Today, we're at about 13,000. So about 13  
12 percent of the minimum. So 100,000 was if most  
13 people charge at home. 200,000 was if most people  
14 charge away from home. So we're at 13 percent. I  
15 think with the PUC's activities it'll bring it up to  
16 about 20, 25 percent, but that's is, and this is for  
17 a million vehicles.

18           So and this is not some theoretical thing.  
19 I drive a battery electric vehicle, and you know,  
20 four years ago when I first got one I could be pretty  
21 certain that I would get a charging space when I went  
22 to work.

23           I am equally certain today that there will  
24 be no charging place when I get to work. I mean,  
25 that's a fact. We're falling behind. And so and

1 this is just for a million, and that's not the end  
2 game.

3           You know, we're talking about, you know, a  
4 million and a half, 3 million, 4.2 million. So I  
5 mean, we're falling behind and infrastructure is  
6 critically important to give the customers the  
7 confidence they need to buy these vehicles. Not to  
8 mention that the infrastructure when it's public also  
9 kind of spreads awareness.

10           So next slide. And so these are our  
11 priorities kind of in order priority, incentives,  
12 incentives, fuel cost. It needs to be simple, low.  
13 The infrastructure, it's needed, and then consumer  
14 education and awareness.

15           So those last three are kind of utility-  
16 centric, the fuel cost, the infrastructure and  
17 consumer awareness and education. Thank you.

18           MR. CRISOSTOMO: And then Beau.

19           MR. WHITEMAN: Sure. It's mine. Okay. I'm  
20 on. I don't have a presentation. It was just going  
21 to be a picture of a bunch of Tesla cars. But my  
22 name's Bill Whiteman. I'm a member of Tesla's  
23 Government Affairs Team, taking the lead on all  
24 things EV infrastructure.

25           So of late it has been a lot of engagement

1 with utilities and working with their regulators to  
2 help support these types of investment programs.  
3 Briefly, I'll give you a quick outline of kind of  
4 where we've come from, where we're going and why  
5 we're so excited that utilities are interested in  
6 getting into this space and the value that that  
7 brings, not only to us, but to all automakers and EV  
8 drivers.

9           So we're currently selling two products, our  
10 Model S and Model X, both in the premium segment. I  
11 think as of this week Model S is our cheapest car and  
12 it's like 76,000-ish. We've discontinued the lowest  
13 end model in preparation for Model 3 launch later  
14 this year.

15           And as we move from the premium segment into  
16 more of the mass market with our upcoming Model 3  
17 this summer, which will start at about \$35,000 and be  
18 produced down in Fremont to the tune of half a million  
19 units a year by next year.

20           Oh, for those of you on the Webinar, my  
21 fingers are cross when I said that. So we're all  
22 very optimistic. And as we make this shift we're  
23 going from a segment of buyers who generally own  
24 their own home, they have a driveway or a garage.

25           Or if they live in a multi-unit dwelling,

1 they're doing okay and they really don't care if it  
2 costs them a little bit extra money to install a  
3 home-charging solution. But by and large our  
4 customers complete the majority of their charging  
5 either at home, or also, when you're in this segment,  
6 a lot of them are self-employed and put in a charging  
7 station at their office and then some for their other  
8 employees, which is great.

9           But by and large, they're charging on level  
10 two systems. We've been heavily investing in the  
11 super charger network over the last five years to  
12 support long-distance travel, and that does  
13 supplement a small percentage of total fleet fuel.

14           But by and large, people are charging their  
15 cars when they're parked. And this, and level two  
16 charging offers the most benefits to utilities, to  
17 environmental causes, because we can take, especially  
18 in California, that energy during the middle of the  
19 day that's being under-utilized and put it into  
20 storage vessels somewhere.

21           The challenge that we have is the up-front  
22 investment of a charging solution at a workplace or a  
23 multi-unit dwelling, or well, let's bring in  
24 disadvantaged communities, too, because I think it  
25 falls right in the same vein.

1           If you're a renter you're not likely to want  
2 to invest 1,000 or more dollars in your own property  
3 for a home-charging solution, and a lot of the  
4 utility proposals and programs that have now been  
5 approved are seeking to fill this gap, which is  
6 fantastic.

7           There's always going to be a need for DC  
8 fast charging. We believe, however, that it's always  
9 going to be a small percentage of fleet fuel. We're  
10 not going to have a world where people are driving  
11 their EVs just like they're driving their gas-powered  
12 cars, especially in cold climates.

13           If cars are sitting out overnight and not  
14 plugged in they're going to lose battery charge and  
15 performance capability due to being left out in the  
16 cold. So in terms of kind of how we get this all out  
17 in front of customers, we very famously don't  
18 franchise and have -- I just counted on our app -- we  
19 have 29 stores in the State of California, most of  
20 them in high footfall, retail centers.

21           If you go down to San Jose we're at Santana  
22 Row. If you go down to Oakland, we're in Walnut  
23 Creek, places where tens of thousands of people walk  
24 through every month and come by and see us. And even  
25 if they don't buy a Tesla, that's okay. We're happy

1 that they come in and talk to us and learn about the  
2 benefits of going electric.

3 Part of our efforts in recent history is  
4 getting a handle on all of the utility investment  
5 programs that are available and making sure that our  
6 customers and charging partners are aware of them and  
7 that we're helping maximize their impact and getting  
8 them into the communities where cars are.

9 I guess with that I'll yield my time, and if  
10 there's questions, I'm happy to answer them. Thank  
11 you. Oh. Oh. Sorry. One more thing. I'll  
12 mention, we -- our CEO tweeted about another pending  
13 product, our heavy-duty semi-truck that we'll be  
14 unveiling later this year.

15 So we'll be -- we've already intervened in  
16 the tree ongoing proceedings, well, that have now  
17 been consolidated with the CPUC to which are  
18 proposing have big investments in the heavy duty  
19 side, which is going to be a very exciting and  
20 challenging arena, but also going to be super, super  
21 cool.

22 MR. CRISOSTOMO: We'll include the tweet in  
23 our record.

24 MR. WHITEMAN: Yes, perfect.

25 MR. CRISOSTOMO: So let's start with the



1 automakers. Yes. Given the advanced technology that  
2 you're developing and are being complemented by the  
3 private industry efforts that we heard about today,  
4 how does that -- and as also the modifications to the  
5 mobility business model, like how does that affect  
6 expectations for deployments and the utility response  
7 to that potential disruption or takeoff in the  
8 market?

9 MR. WHITEMAN: Wow. Sure. I'll dive into  
10 that. So we -- I can't remember which one of the  
11 folks in the POU's mentioned this, but there is an  
12 awfully large pot here, so to speak, when it comes to  
13 the amount of infrastructure that's needed to support  
14 electric vehicles.

15 As we, you know, we have our own production  
16 goals and the state has its adoption goals, and in  
17 order for both of those to get together there's a  
18 whole lot of infrastructure that's going to be  
19 needed, and we have, you know, made a name for  
20 ourselves as we've gone it alone on building out a  
21 network to support our drivers.

22 But at the same time we are so excited and  
23 welcoming of everyone else who wants to come and  
24 joint this massive arena where there's need. As to  
25 your other part of the question in terms of different

1 business models for vehicle ownership, was that where  
2 you're going, too?

3           It's going to be an interesting future.

4 Obviously, with the more automated features becoming  
5 available on vehicles and the ability for some day  
6 self-driving cars, you know, the ability to reduce  
7 your individual need for vehicle ownership increases.

8           And for us at least that hasn't changed  
9 anything yet. It's an exciting future. In the  
10 announcement of Model 3 we included the possibility -  
11 - well, not -- it's more than a possibility.

12           It's going to be a thing some day when the  
13 cars can drive themselves. It can drop you off at  
14 work and go and chauffeur people around all day for  
15 you and make you money on the side. We're a little  
16 ways off, but it's coming.

17           MR. DOUGLAS: Yeah. And I think I'd tend to  
18 agree with Beau on that. I mean, it's great. AV is  
19 -- autonomous vehicles offer a lot of promise. It  
20 could drop you off at work and go back and wait to  
21 charge at the right time.

22           But right now it's just so far in the future  
23 that I think, you know, making plans right now is a  
24 little bit premature. I think, you know, a lot of  
25 things need to be done before then. The

1 infrastructure has to go into place, and you know, I  
2 just think the decisions that we make right now  
3 should probably focus on it.

4 I think Alberto mentioned earlier this  
5 morning, you know, being involved, being engaged in  
6 that AV discussion so that it doesn't -- you know --  
7 you don't get lost as we move towards autonomous  
8 vehicles.

9 But at the same time, I think for planning  
10 purposes now, the focus is probably on vehicles that  
11 have a driver in the driver's seat and maybe level  
12 two or level three vehicles.

13 MR. CRISOSTOMO: So the reason why I started  
14 off with that question is to try to establish some  
15 sort of bound for the uncertainty that the POU's will  
16 be working with in forecasting. As Bill from SMUD  
17 mentioned, he takes a simple proportion of the -- not  
18 -- I apologize for calling it simple, Bill. I didn't  
19 mean that.

20 A proportion of the 4.2 million target that  
21 ARB has published in the Draft Scoping Plan as the  
22 amount of SMUD's population, is that right? And so  
23 in order to understand the trajectory of the number  
24 of vehicles that they should be planning for and the  
25 distribution systems that they'll be accounting grid

1 impacts on, we have to understand the range of  
2 potential outcomes.

3           And I guess I'll direct my next question to  
4 Laura, as a modeler. You talked about how EVs can  
5 fill the belly of the duck. I'm forgetting who had  
6 mentioned having a duck bow. I've talked about  
7 beheading the duck before with vehicle to grid and  
8 demand response during non-peak time charging.

9           In terms of modeling this as a resource,  
10 what data are you collecting to be able to use this  
11 as the flexible load that you would like it to be?

12           MS. SUTLEY: Well, I should say, the  
13 modeling that we're doing in the IRP proceeding at  
14 the Commission is going to be using the same  
15 assumptions that the PUC is going to be using to put  
16 together their Preferred System Plan.

17           And I believe what they're planning to use,  
18 they haven't released their assumptions quite yet,  
19 but the draft I think says that they're going to be  
20 using the assumptions that E3 put together for the  
21 Pathways Modeling that ARB used.

22           So I did take a look at those assumptions  
23 before this, but it's pretty technical and I'm happy  
24 to point you to that site. So we're not -- I should  
25 be clear that UCS right now isn't coming up with

1 independent assumptions about the ability of  
2 individual EVs to contribute towards load shifting.

3           We're not going that. Because of the  
4 analysis that we're doing we want to make sure it's  
5 apples to apples with what the PUC is doing. But I  
6 do have something else to say about that, if I may,  
7 and it's actually a question for the automakers.

8           So obviously, you've heard a lot today about  
9 the potential synergies of electric vehicles and  
10 renewables on the grid if we can make sure people  
11 charge at the right time. And if they don't charge  
12 at the right time it's going to be a lot more  
13 expensive and probably result in more carbon, as  
14 well.

15           And I think everybody wants to avoid that,  
16 and so I agree that electricity rates are really  
17 complicated. They're definitely more complicated  
18 than, you know, dollars per gallon. And so because  
19 it seems to me that the car manufacturers and the  
20 dealers are the first time that someone interacts  
21 with -- the first time that a potential EV buyer asks  
22 questions about impacts of an EV on your pocketbook,  
23 what do you guys think is the solution there?

24           If we want to make sure that people are  
25 charging at times that are best for the grid and we

1 think that an economic signal is going to be  
2 necessary for that, how do we do that and make it not  
3 really, really complicated, and make it so it's easy  
4 enough that a dealer can describe the opportunity in  
5 one to two sentences?

6           And since Tesla has its own showrooms, have  
7 you guys come up with a way to break that down for  
8 potential EV buyers?

9           MR. WHITEMAN: Yes. It is. However, I  
10 mean, it's complicated, but -- and obviously, when  
11 someone walks into a store they could be from  
12 anywhere. It's -- I started my career at Tesla as  
13 managing our D.C. store and we'd have people from all  
14 over the country and all over the world coming  
15 through our store.

16           And back in 2012 it was one of our like  
17 eight stores. So you know, if we had someone come in  
18 from Tennessee, I couldn't help them too much, but if  
19 they came in from the D.C. Metro we could speak to  
20 what utility incentives were available for them.

21           And at the time, just to give you a specific  
22 example, PepCo was offering, it was like four or five  
23 cents off peak in the middle of the night to charge  
24 your EV. And so when people came in to pick up their  
25 car, the first thing -- one of the first things that

1 we would do with them is go and set the timer on  
2 their computer.

3 So even if they got home from work at 6:00  
4 and plugged their car, it wouldn't actually click on  
5 till 12:30 or 1:00 o'clock in the morning.  
6 Obviously, rates change and our ability kind of  
7 dwindles as -- over that time.

8 But at the store level our Staffs are  
9 informed of their utility incentives in the area, to  
10 the best that they can be.

11 COMMISSIONER PETERMAN: As a quick followup  
12 question about that and I would like to hear Mr.  
13 Douglas' comment. So whenever I've gone in to buy a  
14 car, the car dealer types lots of stuff into a  
15 computer.

16 Can't they type something in that then pops  
17 out this database that says, here's your ZIP Code,  
18 here are your incentives? I mean, how hard can it be  
19 for us to put that together?

20 MR. DOUGLAS: The incentives are actually  
21 kind of the easy part, right? I mean, there's a  
22 plethora --

23 COMMISSIONER PETERMAN: For the rates.

24 MR. DOUGLAS: -- of incentives. But the  
25 utility rates, I would -- I can't -- and I've been on

1 many websites, I can't tell you what, like the -- our  
2 lobbyist in our office, he was looking to get a car a  
3 couple years ago and I said, oh, you should check out  
4 the Volt.

5 He lives in Davis. So he's a PG&E customer.  
6 And so he goes to the dealership and says, hey, how  
7 much will it cost me to fuel this. Like, no,  
8 nothing. He never found out, because you can't.  
9 He's a flat rate user.

10 So okay. Well, if you're flat rate it's a  
11 really bad answer to say, well, about the equivalent  
12 of paying \$4 a gallon for gas or 3.50. I mean,  
13 that's a bad answer if you want to sell a car. And  
14 then if you go to time of use, well, I mean, I would  
15 challenge anyone in here within an hour to try to  
16 figure out how much it will cost to fuel a car.

17 I mean, it's just incredibly complicated,  
18 because it depends. PG&E has five different time of  
19 use rates, and it depends on, okay, what's the  
20 summertime rate. How does that customer use  
21 electricity or do they stay home, so they're using  
22 the air-conditioner.

23 So you know, would time of use work for --  
24 so if they go from flat rate to time of use their  
25 bill may go up \$400, and well, that's because they



1 moved from flat rate to time of use, and that's kind  
2 of attributed to their electric vehicle choice.

3           So I mean, it's not at all easy. As to what  
4 would be simple, I mean, what's simple for a salesman  
5 or a dealership to explain is, provided you charge  
6 between, pick something, midnight and 6:00 a.m. your  
7 rate will be 25 cents, 15 cents, whatever it is.

8           The breakeven point for a 40-mile per gallon  
9 car is about 25 cents a kilowatt hour. So pick  
10 something less than that, just so that they know that  
11 it's less than driving on gasoline. That's kind of -  
12 - because I fear that if people -- and we all know  
13 how the blogs work and the Internet works, that if  
14 people get these vehicles and they realize, wait, I'm  
15 paying more.

16           They said it'd cost like a dollar a gallon  
17 of gas. They're going to feel duped and then you get  
18 this backlash against the technology and the people  
19 that they backlash against are the manufacturers and  
20 the dealerships.

21           And so but it hurts all of us in trying to  
22 push this market forward to try to make it  
23 mainstream. Once everyone's on time of use, I mean,  
24 time of use rates are generally pretty low, but  
25 that's the kind of simple, so long as you charge

1 between midnight and 6:00 a.m. it's the equivalent of  
2 paying a buck 50 per gallon of gas, something that  
3 simple, not, well, let's see what your utility bill  
4 was for the last three months, and can you bring a  
5 couple months from the winter, as well; so something  
6 really simple. That's what we'd like to see.

7 MR. CRISOSTOMO: And low.

8 MR. DOUGLAS: And low.

9 MR. CRISOSTOMO: So I'd like to pivot a  
10 little bit, but continue the lines of incentives and  
11 education to Shrayas. For your -- the program you  
12 pointed out to the Plus Up, given the diversity of  
13 disadvantaged communities throughout the state, and  
14 the potential to use, per the POU's suggestions, the  
15 IRP as a way of collecting the types of market  
16 interventions that they're providing to the state and  
17 to help us track what is happening throughout the  
18 statewide service territories, how can we use the  
19 IRPs, in your opinion, to better geo-target and meet  
20 the goals of Plus Up and SB 1275, et cetera?

21 MR. JATKAR: Yeah. It's a good question,  
22 since that IRP development is sort of the main focus  
23 here today. And I have to admit that I'm still new  
24 to the development of those planning documents. So I  
25 apologize if my comments are not quite aligned with

1 what a IRP development process looks like.

2 But hopefully, there's some ability to  
3 expand what can be done there. So you now, I think  
4 one thing that I wanted to point out earlier, that  
5 again, I'm not sure how viable this is for an IRP  
6 development process, but you know, widespread  
7 Transportation Electrification is not only about  
8 meeting our climate targets.

9 It's also about improving air quality. And  
10 the Metropolitan Planning Organizations, local air  
11 districts are also responsible for air quality  
12 improvement. And so I think one thing is really  
13 about coordination and thinking beyond the utility  
14 itself, trying to work with other local and regional  
15 government entities.

16 And so I would encourage that kind of  
17 coordination in terms of thinking about how can, you  
18 know, investment in particular in infrastructure, how  
19 can that be shared amongst these various entities.  
20 And I'll just point out that our group and some  
21 others were involved in updating and revising the  
22 Regional Transportation Plan Guidelines that the  
23 California Transportation Commission adopted in  
24 January of this year.

25 And those Guidelines do call on the

1 Metropolitan Planning Organizations to plan for and  
2 invest in Transportation Electrification, and  
3 encourage them to do so. And so I think there you  
4 would find, hopefully, a willing partner in the  
5 planning and investment arena.

6 Another effort that, again, hopefully fits  
7 in with the IRP process and we've seen some progress  
8 on this in the San Joaquin Valley, is the  
9 synchronization or coordination of utility efforts to  
10 support low-income households.

11 So, So Cal Edison is working closely with  
12 Valley Clean Air Now in the Valley, and working to  
13 identify their care customers so that there's good  
14 targeting of low-income customers and making sure  
15 that they're not only accessing bill assistance, but  
16 also energy efficiency, renewable energy programs.

17 So those are a couple of ideas in terms of  
18 sort of on the coordination front that may be part of  
19 the IRP process. And a couple of other ideas, I  
20 guess, coming back to what I had talked about in  
21 terms of thinking beyond car ownership, is also, you  
22 know, thinking about, are the IRPs a place to begin  
23 piloting and calling out certain sort of experiments  
24 on electric vehicles.

25 You know, as I mentioned, there is pilots

1 just starting underway in Sacramento and Los Angeles  
2 on car-sharing, but I think ride-sharing also offers  
3 a lot of promise, and as somebody who has never owned  
4 a car, electric or otherwise, I'm a big proponent of  
5 transit.

6           And I think that it'd be really interesting  
7 to figure out how moving Ubers and Lyfts towards  
8 electric vehicles and partnerships between the  
9 transit agencies and those corporations to actually  
10 support greater use of public transit I think is  
11 something very interesting.

12           And I know that there's going to be a second  
13 workshop that focuses more on medium and heavy duty,  
14 but maybe just as a preview to say that, of course,  
15 we're interested in the electrification of transit,  
16 as well, and so perhaps there's some effort to bring  
17 the POU's, transit agencies and transnational  
18 corporations, otherwise known as -- or excuse me --  
19 TNC actually is transportation network companies.

20           But those entities can actually work  
21 together to figure out how they can support greater  
22 transit and also greater EV adoption. And one last  
23 thought that I had that I'll share, as I mentioned  
24 again, there's a van-pooling program that's just  
25 getting underway in the San Joaquin Valley.

1           As I was thinking about more urban areas and  
2 POU territory like in Glendale, Burbank and others,  
3 there could be some interesting pilots for worker  
4 van-pools, and thinking particularly of custodial  
5 workers that come into office buildings at night that  
6 -- when transit service may not be available or  
7 really a viable option, you know, is there some  
8 opportunity for sort of a workplace, van-pooling  
9 system for those workers who tend to be low-wage  
10 workers where EV adoption may not be viable, even  
11 with the more and more offerings that are coming from  
12 the automakers.

13           MR. CRISOSTOMO: I want to pivot kind of a  
14 similar question that we posed to the POUs and  
15 something that the charging providers hit on just a  
16 little bit, around data around vehicles load shape.  
17 Are there opportunities for the OEMs to help inform  
18 the POUs load characterization efforts through  
19 partnerships or agreements to share information?  
20 What would be helpful?

21           MR. WHITEMAN: I mean, from Tesla, short  
22 answer is sure. Every time we install a new super  
23 charger we typically share our load profiles with  
24 whichever utility that we're working with so that we  
25 can adequately spec out the site so that we don't

1 hurt anything on down the line.

2 I mean, on the AC charging side it's a  
3 little bit simpler. It just comes down to whichever  
4 hardware is installed, and you have a kind of a flat  
5 line for however long the vehicle is charging. But  
6 you know, we're not too different from the other  
7 OEMs, in that we keep our information pretty tight.  
8 But to the degree that we can, we're very willing to  
9 share.

10 MR. DOUGLAS: Yeah. And I agree with Beau.  
11 I mean, vehicle information, there's some information  
12 that's contained in the on board diagnostic system,  
13 but I don't think that has any kind of load  
14 information that would be useful.

15 I think like Tesla, I think the automakers  
16 do coordinate somewhat with the utilities to provide  
17 information about where the vehicles are going. I  
18 believe that's true, but that's OEM by OEM, and I  
19 think someone had raised, and maybe it was Bill with  
20 SMUD, about coordinating with the DMV to get  
21 information about, because they have the vehicle and  
22 the vehicle types.

23 And then, you know, as far as the load  
24 shaping goes, we have the vehicle where you can set  
25 the timer, and I think all the OEM vehicles you can

1 say, okay, I want -- don't start charging before, you  
2 know, midnight or 10:00 p.m., and then stop charging  
3 after 7:00 a.m. or 2:00 p.m., whatever it is. So you  
4 can do that on the vehicle.

5           And then, you know, there's also EVSEs, that  
6 charges themselves, that I think some have to have  
7 settings and can be controlled. So I don't know what  
8 -- how that works. And then, of course, I think Bill  
9 had mentioned as far as, you know, actually taking  
10 network control, the utility control and the  
11 infrastructure is pretty costly.

12           So, you know, on the vehicle side we can do  
13 a timer, but you know, I don't think the vehicle  
14 receives signals from anything to say, you know,  
15 charge now or, you know, charge in two hours.

16           MR. CRISOSTOMO: Before turning it to the  
17 Commissioners for some final questions, I'll open it  
18 up to the panelists just generally. Are there any  
19 suggestions for the TE Guidance that I had developed  
20 with Tim in providing guidelines for the TE reports,  
21 anything that would be helpful or in addition to what  
22 was proposed?

23           MR. WHITEMAN: I think if I -- I think what  
24 you've provided is great. There is such a -- there  
25 is a need to bring EV infrastructure to parts of the



1 population that are difficult to serve, either as  
2 individuals or even as OEMs.

3 Tesla is not alone in its financial support  
4 of infrastructure for its owners. Virtually every  
5 OEM is putting money into infrastructure in some way,  
6 shape or form. And on the level two side it is so  
7 difficult when you're a renter, even in some  
8 scenarios, if you're a condo owner with a big share  
9 parking facility, if you park on the street or if you  
10 are a member of a disadvantaged community, even if  
11 you have access to affordable EVs, if you're renting  
12 and don't have the ability to pay, you know, however  
13 many thousand of dollars it costs to bring this to  
14 your home, an EV just -- it's not going to be an  
15 option.

16 So utility engagement here is so very  
17 welcome, and I think that the proposals that we have  
18 seen so far will go a long way in bringing the entire  
19 market along.

20 MR. DOUGLAS: Yeah. And I think, you know,  
21 the infrastructure is critically important. And I  
22 guess if I were kind of ranking the importance,  
23 workplace charging is critical because it provides  
24 two things.

25 One, it extends the range of the vehicles,

1 but probably, just as importantly, it provides this  
2 consumer awareness, because you spend a lot of time  
3 with your co-workers, and when you see them charging  
4 you talk to them about their vehicles.

5           And so you get this multiplier effect from  
6 that workplace charging. MUDs, multiple-unit  
7 dwellings, those are critical, because just as Beau  
8 said, if you don't have a charger it's just not an  
9 option.

10           And then one thing that I think is a little  
11 bit -- you know -- a large portion of even pure  
12 battery electric vehicle drivers use 110. So they  
13 just use level one charging at home and it's a huge  
14 percentage. It's like 60-70 percent.

15           And which is fine, but you know, we're kind  
16 of moving from -- hopefully, we're moving from this  
17 early adopters where they're willing to be  
18 inconvenienced a little bit like myself, we want to  
19 move that to the mainstream, where you know, they  
20 don't really want to compromise on anything.

21           So that level one, that eight, 10 hours  
22 charging, really doesn't work if you went out on a  
23 Saturday, did some errands and you come back home  
24 and, okay, well, you got, you know, 40 miles left.  
25 So you know, I think level two at home is kind of

1 important, too, because it's an investment.

2           And once you've made that investment then,  
3 you know, it's there and it's available. And I think  
4 it would encourage people to -- who if they don't  
5 have it, they have no stake. They let that lease go  
6 and they go back out and buy a gas car and they're  
7 done with it. It was a great experiment.

8           But if they have a level two charges, then  
9 maybe it's -- like myself, it's like, okay, well, I  
10 have the charger, I may as well use it. So it's a  
11 little easier. So I don't want just general home  
12 charging to be lost because too many people use level  
13 one.

14           And not that it's a bad thing, but I think  
15 when we want to move to the mass market, that's going  
16 to be important.

17           MR. WHITEMAN: And if I can jump back in  
18 real quick, but something -- and I'm glad you brought  
19 this up -- that I have been bringing up in the  
20 conversations that I've been having is the notion of  
21 expanding the definition of a workplace.

22           All too often when we talk about workplace  
23 charging we're thinking offices, places that we're  
24 sitting. But when we bring in disadvantaged  
25 communities let's talk about people who are working

1 hourly retail jobs, who are working at fast food  
2 restaurants, all of these folks who could be driving  
3 EVs, but don't otherwise have access to charging.

4 And how do we get those types of workplaces  
5 excited about charging hardware on their properties,  
6 as well, is going to be really important.

7 MR. JATKAR: Thanks. Yeah. I guess the one  
8 point that I would hit on is just calling out more  
9 emphasis on disadvantaged communities or low-income  
10 Californians, and particularly in the education and  
11 outreach activities that the POUs would be engaging  
12 in.

13 You know, I think it's important to note  
14 that, and I think somebody had mentioned this on the  
15 last panel, that not all communities are the same.  
16 And so it is important to not just treat  
17 disadvantaged communities as some monolith.

18 There are different needs and different  
19 desires, as well. And so just to call out that the  
20 ARB has recently published its Draft Discussion  
21 Document on Barriers to Low Carbon Transportation  
22 that low-income Californians face, and that's  
23 beginning this process of really doing sort of deeper  
24 dives in specific communities to understand the needs  
25 in specific disadvantaged communities across the

1 state.

2           And I also just want to highlight that I  
3 think it would be a really interesting idea to figure  
4 out how we can create sort of EV ambassadors among  
5 disadvantaged community residents who have started to  
6 adopt EVs. The testimonials that I've read cut  
7 across a lot of issues that have been brought up in  
8 terms of the benefits of EVs.

9           You know, cost-savings is of course  
10 critical, but there's also things that we don't often  
11 think about. You know, people have more reliable  
12 transportation to get to work, or for work. And so  
13 people, you know, grandchildren being taken out by  
14 their grandparents who now have access to a vehicle  
15 is one of the testimonials from the Financing  
16 Assistance Program that ARB has.

17           So being able to capture those, and I think,  
18 you know, spreading that by word of mouth I think is  
19 actually perhaps maybe the most effective way at  
20 really ramping up EV deployments across the state.  
21 And so I think figuring out a way to involve people  
22 who have begun to adopt these kinds of vehicles will  
23 be really helpful.

24           And sort of another point that I wanted to  
25 make earlier, which I'll just end with is, while

1 quantitative data is really important, I think these  
2 kinds of testimonials from EV drivers also makes a  
3 really big different.

4           And in particular, the kind of arenas that  
5 I'm more involved in, you know, in the Legislature  
6 when we're talking about securing dedicated funding  
7 for incentive programs, those kinds of qualitative  
8 assessments of the benefits that EVs have provided to  
9 individuals makes a big difference, in addition to  
10 the quantitative data that we can provide on emission  
11 reductions and cost savings.

12           MS. SUTLEY: The one thing that I'll suggest  
13 is you have in here a list of rate design  
14 modifications to encourage customer electrification,  
15 and I think that those rate design modifications are  
16 only going to be successful if the POUs have a pretty  
17 robust plan for educating and reaching out to their  
18 customers.

19           And so being specific about making sure that  
20 they have a plan to do that. And then also, just  
21 from this conversation, plan the extent to which POUs  
22 have plans to work with the dealers that have EVs in  
23 their service territory to make sure that those  
24 dealers feel like they have the best, most clear,  
25 concise information.

1           If they're asked from a potential EV  
2 customer, what is this going to do to my electricity  
3 bill, they can have a straightforward answer. I  
4 think the POUs have a large role to play in helping  
5 the dealers be better communicators on that.

6           THE CLERK: I think you're channeling our  
7 Plug-In America representative who wasn't able to  
8 come. Thank you.

9           Commissioners, any final questions or  
10 thoughts before we turn it to broader, general  
11 questions?

12           COMMISSIONER PETERMAN: Thank you very much.  
13 A lot of good food for thought and a lot of things  
14 for me to think about in terms of the IOUs. So  
15 appreciate the discussion.

16           COMMISSIONER SCOTT: And I'll echo that.  
17 Thank you.

18           MR. CRISOSTOMO: So Heather.

19           MS. RAITT: Okay. I just want to thank  
20 everybody, and I think we're ready to move on to the  
21 next part, which is the public comment.

22           COMMISSIONER SCOTT: We are. I think were  
23 we going to do the Commissioners' closing comments  
24 first, and then public comment, or --

25           MS. RAITT: If that's your preference.

1           COMMISSIONER PETERMAN: I don't care. I  
2 think those were my closing comments.

3           COMMISSIONER SCOTT: Oh, okay. Good. I  
4 have some additional closing comments. Maybe I'll  
5 just go ahead and make those now before we lose any  
6 of the other folks that are here in the room. First  
7 of all, I know that we had a few folks on the phone  
8 who had some questions.

9           I'm sorry that this wasn't really set up as  
10 a question and answer session, but if you send those  
11 questions to us we will do our best to get answers to  
12 you. I want to just say, thank you so much to Noel  
13 for his leadership on this, and also, acknowledge Tim  
14 Olson and Mike Sokol, the FTD team and the SB 250  
15 team.

16           There's, as y'all know, a lot of moving  
17 pieces that are going on here and coordinating that  
18 and putting it all together in kind of succinct  
19 chunks so we can kind of focus on a piece at a time,  
20 and then put it all together is quite an effort, but  
21 they're doing a great job with that.

22           I want to highlight for y'all that in two  
23 weeks on April 27th we're going to do a focus on the  
24 medium duty, heavy duty sector. We broke them apart  
25 because we think some of the medium, heavy duty



1 issues and topics sometimes have a different set of  
2 people, and it's a little slightly different set of  
3 issues and topics.

4           And so we really wanted to make sure that we  
5 had a chance to hone in on that. It'll be the same  
6 type of format as we did today, but more of a half-  
7 day session, and it's -- we'll be looking at the  
8 Draft Guidance language, and are there things that we  
9 need to include in there that are specific to medium  
10 duty, heavy duty, that aren't in there?

11           Are there things that we have included that  
12 aren't useful? You know, the same kind of discussion  
13 but really focused on the medium duty, heavy duty  
14 sector and the infrastructure that goes along with  
15 that.

16           I want to say to Commissioner Peterman and  
17 Amy and team, I'd love to trade notes with y'all as  
18 you get going on the component for the smaller IOUs,  
19 because I think there probably will be a lot of  
20 overlap between that work that you are doing with the  
21 smaller IOUs and the work that we're doing at the  
22 Commission with the POUs.

23           And of course, we are coordinating well with  
24 one another. I know our teams are talking to each  
25 other, but I'd love to be able to have a little bit

1 of that dialogue with you, as well. And thank you so  
2 much for joining me here today.

3 It's always a lot of fun to get to work with  
4 you, my fellow Commissioner Peterman, from the PUC on  
5 topics with -- that we overlap. So I'm really glad  
6 to get to share the dias with you. And then I just  
7 wanted to reflect back a few things that I heard  
8 today.

9 You heard from Mike kind of a schedule, and  
10 I just wanted to reiterate that a little bit so that  
11 it's clear how everything fits together. As y'all  
12 know, we put together some Draft Guideline topics  
13 that were associated with our February 23rd Workshop  
14 that had two pages of bullets on Transportation  
15 Electrification.

16 What we're doing right now with the document  
17 that you saw from Noel a few days before today's  
18 Workshop is transforming those topics into the  
19 Guideline language, the language that will actually  
20 go into the Guidelines.

21 Mike Sokol will then take that  
22 Transportation Electrification language and drop it  
23 in with all of the rest of the language that we're  
24 developing for the IRP. So you know, the renewable  
25 portfolio components, the energy efficiency

1 components, all of that will come together in one  
2 document that we will then present as a draft to  
3 y'all to discuss at our May 25th Workshop.

4           And then the idea behind that is to get that  
5 draft out before you, have you have a chance to look  
6 at it, get us your comments. We will work, the  
7 Energy Commission, to finalize that and bring it to  
8 the full Commission for consideration at our July  
9 12th Business Meeting.

10           We're working really hard to stay on that  
11 time line, because as y'all probably know, many of  
12 the POUs requested, oh, probably about a year ago,  
13 that they need at least 18 months with the Guidelines  
14 to be ready for the IRPs, which are, the first round  
15 is due on January 1st of 2019.

16           So we're working really hard to try to hit  
17 that 18-months for y'all. So we really appreciate  
18 the partnership and the collaboration. Thank you for  
19 rolling up your sleeves and giving us your best  
20 thoughts in this area, especially on Transportation  
21 Electrification.

22           A couple of things that I wanted to get your  
23 feedback on or ask specifically on the Transportation  
24 Electrification side is, there were a couple places  
25 where folks mentioned some concrete examples of --

1 oh, you mentioned information that you're already  
2 submitting, but in different proceedings or  
3 procedures.

4 So if you have concrete examples of that and  
5 what it looks like so that we can kind of see it and  
6 say, okay, well, let's have it look like that, or  
7 let's recommend that it look like that in the IRPs,  
8 that would be great.

9 Anything concrete and specific that you have  
10 for us, we'd really be looking forward to that.  
11 Same, we heard trying to avoid duplication. So if  
12 there are things that seem repetitive or duplicative,  
13 please be sure to point that out specifically to us.

14 I heard a little bit of talk through the  
15 various panels about the timing of the type of  
16 information that we would like to see in the IRPs.  
17 And so to the extent that you can say, hey, this is -  
18 - and Commissioner Peterman picked up on this, as  
19 well, with her question -- in terms of, okay, what do  
20 you have today.

21 What do you think you might have in two or  
22 three years; what do you think you might have in five  
23 years, and just giving us a good sense of the timing  
24 for when certain pieces of information might be  
25 available, I think will be helpful for us as we are

1 thinking about this.

2 One other thing that would be helpful is how  
3 to specifically address the disadvantaged  
4 communities. And we heard some about that on our  
5 panels, but I think that's another place where it'd  
6 be great to have good thoughts and comments there.

7 So anyway, those are some of my high level  
8 thoughts from today. I really want to say thank you,  
9 again, to all of our panelists, to Noel and Tim for  
10 setting this up, to Commissioner Peterman for joining  
11 me here today.

12 It really does kind of take a village to put  
13 all of this together, and so I appreciate the  
14 partnership, the collaboration and the time that all  
15 of you have spent on this and that I hope you will  
16 spend as you put together some written comments for  
17 us to consider as we hammer out these Draft  
18 Guidelines.

19 So oh, and of course, we have to thank the  
20 IEPR team who always does a fantastic job for us,  
21 getting these meetings running smoothly and they just  
22 do a fantastic job at that. So thank you. Okay. So  
23 with that, let me turn to out public comment.

24 I just have three blue cards here in the  
25 room, and if you're on the WebEx and would like to

1 make a comment, please make sure that you've raised  
2 your hand so that the Staff will know to acknowledge  
3 you.

4 First, I have Steve Taber, and Steve is  
5 followed by Sam Saxena.

6 MR. TABER: Thank you very much,  
7 Commissioners, for sticking around. It's been a long  
8 day. My name is Steve Taber. I'm with eMotorWerks.  
9 I want to talk today a little bit about how to  
10 attract private capital into the task of paying for  
11 the deployment of charging infrastructure.

12 We have goals as a state, a million EVs by  
13 2020, a million and a half by 2025. There is not  
14 enough money in the public coffers to pay for the  
15 deployment of infrastructure by itself. So the  
16 question is, how can we use the public funds and  
17 public policy to leverage private capital into that  
18 task.

19 I've written a detailed white paper on this,  
20 and it's in the docket. I will command your  
21 attention to it. I'll just briefly summarize it  
22 right now. First of all, eMotorWerks is, we're based  
23 in Silicon Valley.

24 We make -- all manufactured in California --  
25 we make EV chargers. We also maintain an IOT

1 platform for managing -- the chargers are fully grid  
2 integrated. We maintain an IOT platform for managing  
3 charging in the entire fleet of chargers.

4 We license that platform to other  
5 manufacturers of chargers and to manufacturers of  
6 EVs. So together with our channel partners we  
7 currently have a market share of somewhere around 50  
8 percent in the residential charging sector.

9 Forgive me. I had some slides, but I was  
10 told I was not allowed to give them. So I'm trying  
11 to --

12 COMMISSIONER SCOTT: But please make sure  
13 they're in the docket, you know.

14 MR. TABER: Yeah. Okay. Great. Great.

15 COMMISSIONER SCOTT: The summary's good for  
16 us. We'll read the presentation.

17 MR. TABER: Okay. So the big picture here  
18 is that if properly deployed, public funds can be  
19 used to leverage private capital, attracting private  
20 capital into the deployment task at a ratio of  
21 somewhere between two to one, or as high as five to  
22 one private funds to public.

23 So for example, just hypothetically, a \$10  
24 million outlay of public funds could be used to  
25 attract as much as \$50 million in private money into

1 the deployment task, deploying as many as 67,000  
2 residential chargers and adding as much as four  
3 terawatt hours of energy services to the grid per  
4 year.

5 This is accomplished by capturing revenues  
6 from the CAL ISO wholesale markets and then basically  
7 using project financing to front load those monies to  
8 provide the capital for the deployment of charging  
9 infrastructure.

10 In a typical scenario, there's an example  
11 analyzed in the white paper, I take one charger with  
12 a daily charging load of 12 kilowatt hours on a time  
13 of use tariff. And with all due respect to my  
14 colleague here, I don't think they're that  
15 complicated, with our platform and with our smart  
16 phone interface, the managing of the charging in  
17 concert with the time of use rates is fairly  
18 straightforward.

19 Now, this typical EVSE generates between 200  
20 and \$300 per year in revenue out of the wholesale  
21 markets. So the lower number is with current time of  
22 use rate, if the time of use, off peak period is  
23 modified to include the belly of the duck, then that  
24 number gets up to closer to \$300 per year.

25 Now, this analysis does not include other



1 benefits such as grid upgrade deferrals and things of  
2 that nature. This is just revenues from the  
3 wholesale markets. So this stream of revenues, then,  
4 can be leveraged to attract private capital, and  
5 there are two models analyzed in the white paper.

6 One is venture financing and the other is  
7 project financing. Venture financing is risk  
8 capital. Those are the people that can stand to lose  
9 the money and don't mind taking a gamble. Project  
10 financing is risk mitigate financing.

11 I'm sure you're familiar with it. It's  
12 widows and orphans type of financing, and that  
13 attracts a much lower return on capital. So in these  
14 two examples, our exemplary charger can -- with  
15 venture financing -- can leverage at a ratio of about  
16 three to two, private money to public money, and with  
17 project financing can leverage at a ratio of about  
18 five to one, private money to public money.

19 COMMISSIONER SCOTT: So I'm going to ask  
20 that you wrap up, but we will -- we have your white  
21 paper and the presentation and we'll definitely take  
22 a look at it. But if you have a summary --

23 MR. TABER: One more minute then, if I may.  
24 To attract -- may I, one more minute?

25 COMMISSIONER SCOTT: Can you just do the

1 wrap-up summary for us?

2 MR. TABER: I can, certainly. To attract  
3 project financing we have six recommendations. First  
4 of all, enable long-term fixed-price PBAs for grid  
5 services. Secondly, allow DRPs to participate in the  
6 wholesale markets with no minimum resource quantity.

7 Currently, you have to have a 500 kilowatt  
8 minimum. Since chargers are a few kilowatts each,  
9 that requires a large aggregation. That means a  
10 substantial number of -- that means all participants  
11 are going to be delayed and many participants are  
12 going to be stranded outside the program.

13 Third, direct the LLCs to share the benefits  
14 that they are accruing. Do not let them free ride.  
15 Fourth, set aside a substantial portion of whatever  
16 public funds are available for the residential  
17 sector, where you get a high bang for the buck.

18 Five, spread the incentives broadly. If  
19 properly structured, as little as \$150 per charger is  
20 enough to employ a lot of chargers and have a very  
21 attractive value proposition. And finally, minimize  
22 friction in the customer enrollment process, which  
23 right now is a nightmare. So in this regard,  
24 Commissioner Peterman, the Click Through Working  
25 Group is doing God's work. Thank you very much.

1 COMMISSIONER SCOTT: Thank you.

2 COMMISSIONER PETERMAN: And Commissioner, I  
3 will note that eMotorWerks is the first aggregator of  
4 EV vehicles into the Demand Response Programs, and so  
5 they have this experience that they are sharing. So  
6 thank you very much.

7 COMMISSIONER SCOTT: Great. Thank you. I  
8 Samveg Saxena, followed by McKinley Addy. Sorry. Go  
9 ahead.

10 MR. SAXENA: Hello, Commissioners, everyone.  
11 My name is Sam Saxena. I'm a scientist at Lawrence  
12 Berkeley National Laboratory. In the electricity  
13 sector California has pioneered demand side energy  
14 efficiency. Some call this the Rosenfeld Effect.

15 I'm here today to share with you how we can  
16 create a much-needed Rosenfeld Effect in the  
17 transportation sector. Berkeley Lab has developed  
18 MyGreenCar, an app for car buyers. To understand  
19 what the app does, put yourself in the shoes of  
20 someone looking to buy a car.

21 Maybe you want to make the greener choice,  
22 but you're not sure if an EV is a viable option for  
23 you. For your commute and your outlier trips, will  
24 range anxiety be a problem? How will traffic, hills  
25 and weather affect things?

1           Do you need an expensive charger at home?  
2 Do you need a charger at work? How will your  
3 electricity costs compare against your gasoline costs  
4 for a comparable, conventional car? All these  
5 questions are difficult to answer for car buyers.

6           As Commissioner Peterman said, it would take  
7 over an hour. Uncertainty is a major barrier to EV  
8 adoption. MyGreenCar eliminates these uncertainty  
9 barriers. For a car buyer, just download the app,  
10 drive like normal in your current car and the app  
11 takes care of all the hard work to give you  
12 actionable information on the greenest cars for you.

13           For POUs, MyGreenCar gives an inexpensive  
14 data collection tool to measure the needs of car  
15 buyers and drivers without deploying any hardware.  
16 The app is built on top of Berkeley Lab's Vehicle to  
17 Grid Simulator that CEC's own Demand Analysis Office  
18 is using to forecast EV load growth in California.

19           By providing visibility into when people are  
20 looking to buy cars and how they travel, MyGreenCar  
21 not only gives POUs the ability to forecast and plan  
22 when EV charging is needed -- pardon me -- where EV  
23 charging is needed, but also to see when it is  
24 needed, based on when people are buying cars.

25           Finally, and perhaps most importantly,

1 MyGreenCar can give POUs the ability to measure  
2 success towards SB 350 goals. User throughput and  
3 impact on car buyers is easily measured in the app.  
4 the resulting fuel and greenhouse gas savings are  
5 easily projected.

6 To summarize, MyGreenCar is an app for car  
7 buyers. It eliminates the uncertainty barriers to  
8 accelerate EV adoption. It will revolutionize how  
9 [sic] EV outreach and education, and it will provide  
10 an inexpensive tool for collecting data, forecasting  
11 and planning for Transportation Electrification.

12 It will allow POUs to measure progress  
13 towards SB 350 objectives. Most importantly,  
14 MyGreenCar is ready to deploy today. It can rapidly  
15 scale to millions of car buyers. It will produce  
16 early, measurable and highly visible progress.

17 At Berkeley Lab we aim for MyGreenCar to  
18 become California's app for car buyers. We invite  
19 the Energy Commission and POUs to adopt MyGreenCar in  
20 their Transportation Electrification efforts. We  
21 look forward to working with you to build on Art  
22 Rosenfeld's legacy by applying MyGreenCar to create  
23 the much-needed Rosenfeld Effect in the  
24 transportation sector. Thank you.

25 COMMISSIONER SCOTT: Thank you. I've got I

1 think it's McKinley Addy, followed by Jonathan  
2 Changus.

3 MR. ADDY: Commissioners, good afternoon.  
4 Forgive my voice. I think I'm coming up with  
5 something. But I'm McKinley, McKinley Addy. I'm  
6 with ADTRA, a virtual integrator of low carbon, high  
7 efficiency technologies at scale, using private  
8 capital.

9 Thank you for the opportunity to comment.  
10 My comments cover two topics, perhaps three. But  
11 first, I'd like to commend the Energy Commission  
12 Staff for their work in exploring how they see  
13 Transportation Electrification unfolding as part of  
14 the POU IRP process.

15 I also wanted to acknowledge publicly the  
16 excellent work that CPUC Staff and Commissioner  
17 Peterman did in the September 2016 SB 350 ruling for  
18 IOUs' pilot projects. The reason that that ruling is  
19 so important is because it links the SB 350  
20 Transportation Electrification benefits to the State  
21 Alternative Fuels Plan, and the related Joint Agency  
22 Report on Reducing California's Petroleum Dependence.

23 Other than through the LCFS indirectly, the  
24 AB 1007 Report, the State Oilfields Plan and the  
25 Petroleum Reduction Plan lacked an implementing

1 mechanism. SB 350 provides that mechanism and more  
2 importantly, SB 350 represents continuity of state  
3 transportation energy policy and predictability for  
4 investment decisions.

5 And we would recommend that wherever  
6 possible, to link advancing SB 350 targets to the AB  
7 1007 and 2076 outcomes to highlight this important  
8 continuity.

9 My second comment is about getting the cost  
10 picture for EVs right, because it can affect EV  
11 penetration forecasts, which in turn can impact TE,  
12 or Transportation Electrification load and utility  
13 investment decisions.

14 One cause dynamic that needs attention we  
15 believe is interaction between the unrecovered  
16 manufacturer EV cost, the incremental cost to  
17 consumers and available public incentives. Several  
18 reports suggests that GM and Nissan lose close to  
19 \$10,000 -- 8,000 to \$10,000 for each EV sold, and  
20 perhaps higher costs for an EV that might be coming  
21 onto the market soon.

22 If manufacturer losses were factored into EV  
23 prices what would the true price of passenger EVs be?  
24 What would the level of incentives need to be to  
25 support the EV penetration levels to realize

1 California's EV deployment targets for fuller priced  
2 EVs?

3 Slide nine of Bloomberg's presentation noted  
4 that without incentives EV total cost of ownership  
5 isn't cost competitive with gasoline passenger  
6 vehicles under current battery price points. In the  
7 absence of incentives for EVs will the adoption rates  
8 be less?

9 Would utilities' investments be similarly  
10 affected? It would seem that business model  
11 innovation and financing models innovation, which  
12 Commissioner Peterman asked about, assume additional  
13 importance under these circumstances.

14 COMMISSIONER SCOTT: I'm going to have to  
15 ask you to please wrap up.

16 MR. ADDY: Yes. TE success is important to  
17 California's broad transportation energy goals across  
18 vehicle classes and fuel. So we hope close attention  
19 is paid to the EV cost dynamic and the strategies  
20 required to address them. Thank you.

21 COMMISSIONER SCOTT: Thank you. And we  
22 always read the comments that are in the docket. So  
23 please make sure that you have your full thoughts in  
24 the writing in the docket and we'll be sure to see  
25 those, just like the gentleman before you's



1 presentation.

2 MR. ADDY: Thank you.

3 COMMISSIONER SCOTT: Thank you. Jonathan.

4 MR. CHANGUS: Hi. Jonathan Changus,  
5 Northern California Power Agency with a very quick  
6 request. The two weeks, just a modest extension on  
7 the written comments. I believe we had a 28th and  
8 the docket period, I believe some of us are spending  
9 about 50 percent of our workdays over the next two  
10 weeks at the CEC or some other agency.

11 So if we could just get a modest extension  
12 to I believe like May 2nd or whatever that -- two  
13 weeks from today would be very, very much  
14 appreciated, so we get good response from our  
15 organizations.

16 COMMISSIONER SCOTT: Sure. Let me check in  
17 with Chair on the timing. The Chairs kind of set the  
18 timing to make sure that we hit that May 25th  
19 Workshop. So let me circle back and we'll be sure to  
20 give you a response on that.

21 So that's all the blue cards I have from  
22 folks in the room. Do I have any commenters on the  
23 WebEx or the phone?

24 MS. RAITT: Well, I do have a couple  
25 comments from WebEx that came in this morning --

1 COMMISSIONER SCOTT: Okay.

2 MS. RAITT: -- that I can just read to the  
3 record.

4 COMMISSIONER SCOTT: Yes, please.

5 MS. RAITT: It says, this is from John  
6 Shears at CERT. Unfortunately, I have multiple  
7 conflicts today and can't cover the rest of the  
8 Workshop. So I will be traveling this afternoon.

9 A question that I have is, given that the  
10 fuel cell electric vehicles are part of the state's  
11 ZEV action plan and that demand for renewable  
12 hydrogen will be growing rapidly, see AB 8 report,  
13 what role do the utilities and the agencies see for  
14 renewable hydrogen connected to the duck curve?

15 I'm thinking in terms of benefit load during  
16 period of peak renewables or during the duck's belly,  
17 when there can be low or even negative pricing, to  
18 generate EH-2 that can be stored and use either in  
19 stationary fuel cells to help with periods of peak  
20 demand, e.g., during the ramp of the duck's neck, or  
21 to fuel FCEVs.

22 This applies not only to LD FCEVs in the  
23 near term, but also extends to MD and heavy duty  
24 FCEVs in the mid and longer term. So I think that's  
25 basically a comment, but I will just add briefly to

1 say that we do have a couple of upcoming workshops  
2 that will also touch on renewable hydrogen.

3 We have the May 11th workshop, which is  
4 going to look at renewable hydrogen as one of several  
5 potential solutions to helping integrate variable  
6 resources, and then later, we have the June 27th  
7 Workshop, which will go more broadly into renewable  
8 hydrogen. A second comment --

9 COMMISSIONER PETERMAN: I just want to make  
10 a comment about that.

11 MS. RAITT: I'm sorry. Yeah.

12 COMMISSIONER PETERMAN: Which is for the  
13 investor owned utilities where we focus the first  
14 Transportation Electrification plans is on electric  
15 vehicles, but we're very supportive of the state's  
16 broader commitment to ZEVs and to fuel cell vehicles,  
17 and it's a question that we are thinking about and we  
18 look forward to input for our utilities about how the  
19 PUC and the utilities can be supporting fuel cell  
20 vehicle deployment.

21 And one of the things, as I understand it,  
22 one of the main drivers of cost for hydrogen  
23 production is electricity, and so there's various  
24 ways in which our Commission could engage on this  
25 issue.

1           On the broader issue of hydrogen vehicles,  
2 I'm excited to see further results from -- SoCalGas,  
3 has a power to gas pilot. So they're our first  
4 utility to really be focusing on the production of  
5 hydrogen and thinking about the nexus of their work  
6 in the electricity sector with hydrogen.

7           So it's an area which I'm interested in and  
8 I continue to see feedback on, but our most immediate  
9 opportunities as a Commission is centered on EVs.

10           MS. RAITT: Okay. The second one is from  
11 Indra Singhal. I'm sorry if I'm -- I'm sure I'm  
12 mispronouncing that. She has questions that I think  
13 actually we would just try to address offline, but  
14 I'll go ahead and read them.

15           During Noel's PowerPoint, what are the POUs  
16 and CECs doing to help end-users of EV purchase  
17 decision processes? Second one, during the  
18 presentation on the future penetration ZEVs, for the  
19 representatives from Navigant and Bloomberg, is there  
20 -- the question is, is there concern that changing  
21 federal policies may derail these goals? What is  
22 California's stance to counter regression? So.  
23 Anything?

24           MS. RAITT: I think Alberto Ayala answered  
25 that pretty clearly in his presentation this morning.

1 So I'd let that stand on the record as the answer to  
2 that question.

3 MS. RAITT: Okay. Great. And does anyone  
4 else have their hand up on WebEx?

5 MR. CRISOSTOMO: I guess to immediately  
6 respond to the influencing PEV adoption, Commissioner  
7 Scott, could you mention the Voucher Program that was  
8 just approved during the --

9 COMMISSIONER SCOTT: Go ahead. Do you want  
10 to talk about it or you want me to?

11 MR. CRISOSTOMO: You, I think you provided  
12 the NPR sound byte. So it might be appropriate for  
13 you --

14 COMMISSIONER SCOTT: Oh, all right. Happy  
15 to do that. Well, so basically, at the Energy  
16 Commission on the infrastructure side what we've done  
17 is put together a Voucher Program that's similar to  
18 what the Clean Vehicle Rebate Project looks like, so  
19 that will hopefully get the infrastructure moving out  
20 there a little bit faster.

21 People will be able to apply to the program  
22 to get a voucher to then refund the cost of putting  
23 that infrastructure in place. We just recently  
24 awarded that. It went to CSE. So there's some --  
25 that was a competitive solicitation and they won it,

1 but there's some nice synergy there between them  
2 running the CBRP Program and then also running the  
3 Voucher Program.

4 And they are currently designing, putting in  
5 place all of the components, because of course,  
6 there's key things like making sure infrastructure  
7 gets to disadvantaged communities and other things  
8 like that, that will be overlays.

9 It's not just a free for all on the voucher  
10 money. So that is there. We just approved -- the  
11 Energy Commission in full approved that at the  
12 Business Meeting last week.

13 MS. RAITT: It's last week?

14 COMMISSIONER SCOTT: Yeah. Thank you. It's  
15 exciting. Any other comments on the Webex?

16 MS. RAITT: I think that's it.

17 COMMISSIONER SCOTT: Or the phone? Okay.  
18 With that, then, we are adjourned. Thank you,  
19 everyone, for a great day.

20 (Adjourned at 4:28 p.m.)

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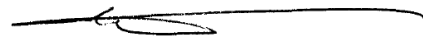
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