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California Code of Regulations, Title 20 Section 1601 through Section 1608)

Staff Workshop
2010 Rulemaking Proceedings
Phase II on Appliance Efficiency Regulations

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

MONDAY, OCTOBER 11, 2010
10:00 A.M.

Reported by:
Peter Petty

Commissioners Present

Anthony Eggert, Presiding Member, Efficiency Committee

Staff Present:

Mike Leaon
Paula David
Ken Rider
Dennis Beck
Harinder Singh

Also Present (*via WebEx)

Presenters

Pat Eilert, Pacific Gas & Electric (PG&E)
Jordana Cammarata, CA Public Utilities Commission (CPUC aka PUC)
Bill Knox, CA Aor Resources Board (CARB aka ARB)
Suzanne Foster Porter, Ecos Consulting
Pierre Delforge, Natural Resources Defense Council (NRDC)
Randall Higa, Southern California Edison (SCE)

Public

Larry Albert, Stanley/Black & Decker
Robert Nachtrieb, Lutron Electronics for NEMA
Wayne Morris, Association of Home Appliance Manufacturers (AHAM)
*Jon McHugh
Rick Habben, Wahl Clipper Corp.
Rick Erdheim, Philips Electronics
Joanna Mauer, Appliance Standards Awareness Project

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P R O C E E D I N G S

OCTOBER 11, 2010 10:06 A.M.

MR. LEAON: Good morning and welcome. This morning we are having a staff workshop on Battery Chargers and Lighting Controls and I want to welcome everyone to the meeting and we'll get things started here. For the record, my name is Mike Leaon, I am the Manager of the Appliances and Process Energy Office at the Energy Commission. I think we have a very good workshop for you today. We will be providing a little background on the battery chargers and the development of the test method for battery chargers, and provide some process background on how we got to where we are today, talking about standards, efficiency standards for battery chargers.

In addition, we will be talking about moving Title 24 Lighting Control Standards to Title 20 and the impacts of that proposal. However, the centerpiece of the workshop today will be the Case Report and the proposal from PG&E and their consultants, Ecos, for Battery Charger Standards. And we will be hearing from PG&E on that proposal today.

In addition, we will also hear some policy discussion. We have representatives from Air Resources Board here today and also the California Public Utilities Commission, and I am very pleased to have their participation, as well as a discussion on the benefits of

labeling from a representative with the National Resources Defense Council, and we will also hear a talk from Randall Higa with Southern California Edison on battery chargers for on-road vehicles.

We do have a few housekeeping announcements that we need to make, and then we will hear from the Presiding Member of the Efficiency Committee, Anthony Eggert, who will kick off the workshop with some opening remarks. At this point, I would like to turn the presentation over to Paula David, who is the Supervisor of the Appliances Unit here at the Energy Commission, and she will run through – well, I guess I have taken care of running through the Agenda, Paula, my apologies – so she will run through some housekeeping announcements for the workshop today. Thank you.

MS. DAVID: Thank you, Mike. As Mike already noted, my name is Paula David. I am the Supervisor of the Appliance Standards Program, and our program includes, in addition to the rulemaking activities, the certification, compliance, and enforcement efforts, that all go along with Title 20.

Our standard housekeeping items, for those of you not familiar with the building, the closest restrooms are located behind you, behind the frosted glass. There is a snack bar on the second floor under the white awning, and

most importantly, in the event of an emergency and if the building is evacuated, please follow our employees to the appropriate exits. We will reconvene at Roosevelt Park, which is diagonal across the street from this building. Please proceed calmly and quickly, again, following the employees with whom you are meeting, to safely exit the building. Also, to mention today, both of our elevators are down; the access to the second floor, therefore, is either up the stairs, or we have a freight elevator in the back of the first floor that meets ADA requirements. Also, a reminder, please use the Ninth Street door, not the P Street door, the P Street door will sound an alarm. And also a reminder, there is a sign-in sheet in the front counter as you came into the Hearing Room area, if you did not sign in on the way and you definitely want to be included in our mailing list, or listserv, please stop later and use the sign-in sheet. You can also sign in for the listserv yourself from the Internet, you do not need to use the sign-in sheet.

Another item, the blue cards, if you are familiar with workshops and hearings, we have a time at the end of the agenda at 1:45 for the open discussion, and we will go first come, first serve, with the blue cards. If you don't have one, I will walk around afterward and hand out blue cards to anyone who wants one. Also, they are located out

front on the front counter by the sign-in sheet.

On our website, we will also have – we actually do now have posted a copy of the Agenda, and any minute now, a copy of the Case Report that will be presented by PG&E should be available on the Web, as well. And I think that does it for the housekeeping items. Thank you, everyone for coming. We really appreciate the time and effort you've made to be here with us today. And I will turn the meeting over to our Presiding Member of the Efficiency Committee, Commissioner Anthony Eggert.

COMMISSIONER EGGERT: Thank you, Paula. Good morning, everybody. I am excited about this workshop today, particularly because this is about energy efficiency and energy efficiency is California's most important resource. I think probably most of you who are here are aware, California has a loading order in terms of how we meet our energy goals for the State, and the number one resource is energy efficiency, followed by renewable energy, and then followed by, if necessary, fossil generation. And I think this order has served us quite well over the last 30 years, it has delivered billions of dollars to California consumers in the form of energy savings, it has allowed us to stabilize our per capita consumption, it is really, I think, the cornerstone of California's clean energy goals. Plug loads represent one of the fastest growing loads on our

system, our electricity system, here in California, and battery chargers at over 7,000 Gigawatt hours per year, represent one of the largest and fastest growing contributions to that load. Even more amazing, as I was reading through the materials, is that more than half of that energy never makes it to the end product, it is lost, some might even say wasted, in the form of heat standby power, and other parasitic losses.

The estimates in the case study that you will be hearing about today from PG&E suggest that we could reduce that loss by more than half, saving us more than 2,800 Gigawatt hours per year. This is the same amount of energy that could power 400,000 – more than 400,000 households, a tremendous potential savings for the State.

The workshop today is going to provide you, those here in the industry, stakeholders, and the public, and opportunity to provide input and comments on the concepts and the supporting information that we will be using to develop the standards for these chargers, and we need your input to develop a good standard, one that achieves the greatest potential savings that is cost-effective and feasible.

I want to thank the staff for their hard work in putting this workshop together. I also want to thank the utilities, particularly PG&E, for providing the case study

that will be talked about, and I want to thank all of you, the participants, especially those from the industry that are intending to provide input into this process. I look forward to seeing the results of this workshop. We are going to be having a Committee workshop on November 18th, and so the staff report will be made available before that and, as the presiding member of the efficiency committee, I just want to commit to everybody here that the committee is going to pursue the standards, develop them as expeditiously as possible, so that we can accrue the savings and help meet our energy and environmental goals. So, I think with that, I will turn it back over and I look forward to the result. Thanks.

MR. LEAON: Thank you, Commissioner Eggert. Okay, we are going to begin with a presentation from Ken Rider, who is staff to the Appliances Unit. But I would like to ask if there are questions for any of the presentations today, that you be sure to fill out a blue card and bring those up, and we will take a few questions after each presentation, but we do have time at the end of the day for open discussion, so I would like to stick to the schedule on the agenda as close as we can, and we will provide time at the end of the day for additional questions. But, as time allows, we will take a few questions after each presentation. And, with that, I would like to turn it over

to Ken for his presentation.

MR. RIDER: Hello, everyone. Good morning. My name is Ken Rider. I am a Staff Engineer, an Electrical Engineer with the Appliance Efficiency Program. Can you guys see this? When I sat down there, it looked a little faded. If you bear with me for a second, I am going to go ahead and try to improve the lighting in this room. Is that better? Okay. All right, so I am going to begin this presentation kind of broad, talking about some of the policy and authority of the Energy Commission, and then focus more on what we are here to talk about, which is battery chargers and lighting controls.

So, energy efficiency is a key strategy to meeting several of the policies here in California. We have several people here from other agencies, including the Public Utilities Commission and Air Resources Board. I will let them go into the specifics of those policies, but I want to start by introducing the Warren-Alquist Act. That is the Act that actually defines the Energy Commission and its authority, and I will focus this presentation on that.

So, the Warren-Alquist Act dictates what an Appliance Efficiency Standard is in terms of the California Energy Commission. There are three – and Commissioner Eggert just made these points – three primary attributes that an Appliance Efficiency Standard must have in

California. The first is that the standard is for an appliance that has significant statewide energy use, so that way we can all regulate appliances that, you know, like a wristwatch or something, so that it isn't a waste of time. The second is that the Regulations be feasible and attainable, that means it's actually possible for industry to meet these standards, and the last, I'm just going to read the quote straight from the Act: "It shall not result in any added total cost to the consumer or the design life of the appliance." In addition, the Warren-Alquist Act gives the Energy Commission authority to set performance and proscriptive standards. It also allows us to specify testing, marketing, and labeling of appliances. And, in addition, it allows us to enforce these regulations through collection and verification of data.

I want to take the time to read these two findings in the Warren-Alquist Act because they are very relevant to why we do appliance efficiency standards. The first one is: "The electrical energy is essential to the health, safety, and welfare of the people of California and to its economy, and it is the responsibility of the Energy Commission as a State agency to ensure that a reliable supply of electrical energy is maintained." Another finding is that: "There is a concern that the rapid rate of growth in electrical energy consumption due to wasteful and inefficient appliances that,

if left unabated, will result in serious depletion, or irreversible commitment of energy, land, and water resources, and potentially threatens the State's environmental quality."

So, I would like to take the time to talk about a few of the benefits of appliance efficiency. The first is that, at least for now, it's the cheapest way to meet energy demand. It's the lowest hanging fruit in terms of need and demand in the State. So, through doing appliance efficiency standards, we reduce this demand and that results in lesser need to construct new power plants, to site new transmission lines, and this in turn increases the system reliability. In addition, I think Commissioner Eggert also mentioned this, that it reduces the need to build fossil fuel-related power plants, and therefore it helps California achieve some of its renewable energy goals.

And this graph really illustrates some of the benefits of energy efficiency. What we have here in blue is California, and green is the United States. The Y Axis here is kilowatt hours per capita, and the X Axis here is time. And as you can see from about 1975 to 2000 on this graph, the energy consumption per capita has remained relatively flat, which is not the case in the United States, and this is partially due to the fact that California has aggressively pursued energy efficiency.

Just to give you an idea of some of the numbers and to quantify the impact of appliance efficiency standards, the few regulations we most recently adopted, one for televisions and one for general service incandescent service screw-based lamps, combined they are estimated to save 18,768 Gigawatt hours by the year 2020, that is a huge number. In addition, our Demand Analysis Office estimates that the existing Standards, the ones that are already in place and effective, are already saving another 18,000 Gigawatt hours per year. And to try to convert, it is not a clean conversion, but to try to convert this into a monetary benefit to the State, if you take the average consumer rate of $.14 per kilowatt hour, and you multiply it by these two numbers added together, that ends up being about $5.2 billion in avoided utility bill costs. And that does not even include avoided costs from constructing new power plants and trying to site and build new transmission lines in the State. In addition, to generate this amount of energy, you would need 4,286 megawatts of electrical generation, and that is approximately the same size as the two biggest power plants in the State today.

So now I would like to get into the actual topics, so Battery Charger Standards. This is something that has a long history, actually, it is not something that we are just beginning to talk about today. In 2001, in the middle of

the energy crisis, the Legislature passed AB 970, or Assembly Bill 970, and that calls for the Energy Commission to investigate any Energy Efficiency Standards that we could to mitigate demand challenges we had in the energy crisis. So, as a result of that, the Energy Commission had to identify external power supplies and battery chargers as being one of those savings opportunities. In 2004, we initiated a rulemaking for both of these appliances. We adopted regulations eventually for external power supplies, but we found that the test procedure for the external power supplies did not apply to battery chargers.

So, to address this, in 2005, PIER, which is the Public Interest and Energy Research, that is a subdivision of the Energy Commission that funds research and development across the State, they funded the development of the Battery Charger Test Procedure. As a result, in 2007, a Draft Battery Charger Test Procedure was released, and in 2008, through a rulemaking, which many of you here, I see, are familiar from that, through that we adopted that Battery Charger Test Procedure with some amendments. Since that time, the test procedure has been used to gather data which can be used for standards development, which is what we are talking about today, which is the development of standards for battery charger systems.

So I would like to begin to kind of identify the

scope of what we are talking about, it is very broad, we are talking about small and large battery chargers, things ranging from, you know, as small as a an MP3 player, or a AA battery charger, all the way up to a forklift charger, but with one notable exception, we are not considering at this time any battery charger regulations for highway vehicles, so plug-in, highly capable, maybe hybrid vehicles or whatever is out there today. Again, the reason why we are looking at battery chargers is not only because of the 2001 findings we had for AB 970, but also, in 2007, part of the Scoping Order for the next set of rulemakings, including battery chargers, so it has been identified several times as a significant energy savings opportunity. In fact, I am sure Ecos will get into this in more detail, the potential looks to be about 2,700 gigawatt hours a year.

The other topic that we are here to discuss is lighting controls. There have been lighting control requirements in the Energy Commission's Building Regulations since its first publication, which is, I don't know, I think some time in the late '70s. The Code determines what kind of lighting controls can be installed in buildings. The Title 24 Regulations include requirements necessary to achieve energy savings through Smart Control design. Currently, lighting controls which do not meet requirements can be sold, but cannot be installed in California. By

moving the regulations from Title 24 to Title 20, the lighting controls which do not meet the requirements will not be allowed to be sold or installed, which closes a loophole in the regulations. In addition, it will cause them to be certified at the Energy Commission the same way that many appliances are certified today.

So I would like to run through the rulemaking schedule. We are here today, October 11th, at the workshop, a staff workshop, the deadline for written comments for this workshop is October 29th, which is roughly three weeks from today. We plan on releasing a staff report outlining some proposed regulations on November 15th, and we plan on holding a Committee workshop, as Commissioner Eggert mentioned, on November 18th. And that will all funnel into a formal rulemaking sometime in December, tentatively.

I would like to take the time to talk about the written comment process. So, the comments will be used to inform us and, as Commissioner Eggert mentioned, you know, really give us feedback on what we should be looking at on Battery Charger Systems. As I said, we plan to publish a staff report on November 15th, any of the feedback we receive will be very useful in drafting that report. You can submit comments in the mail if you wish, probably the best way to do it is by submitting it through e-mail to this e-mail address here, Docket@Energy.State.CA.US, and please be sure

to include a docket number and that lets us know that you intend for this to be a public comment on this subject and we will include it in the docket.

In addition, staff is available to answer any clarifying questions, both after this workshop through e-mail, through phone, and again, just to reinforce this, the deadline for comments is October 29th. And I will turn it over to Mike, unless there are any questions, I suppose? Or do we want to save that until the…?

MR. LEAON: Thank you, Ken. Yeah, let's see if we have – do we have any blue cards in the room for questions on this presentation? And I believe Paula is going to get some blue cards. Do we have any? Yes, go ahead and bring them up.

MR. RIDER: I am going to go ahead and turn the lights back up for the moment.

MR. LEAON: All right, if anyone else wants to ask questions on this presentation, please provide a blue card and I will call you to come up, and when you come up to the podium, if you could state your name and the organization you represent, and I would also ask that you provide a business card for our Court Reporter. Thank you. All right, so the first question I have is from Larry Albert. Larry, if you could come up and state your name and organization?

MR. ALBERT: Larry Albert from Stanley/Black & Decker, representing the Power Tool Institute. Just a general question regarding the conduct of the meeting. We understand there are going to be Case Reports and a proposal presented today, and we understand also that it was just posted on the website. We haven't had an opportunity to review any of those documents prior to this meeting and, in the spirit of trying to participate in a meaningful way, we would like to have obviously some awareness of these proposals prior to public meetings such as this. Is there any opportunity now for stakeholders to have copies of those Case Reports?

MR. LEAON: We will have the Case Report posted to the Web today. We can look into seeing if we can get some photocopies made for you today. Let me ask Ecos or PG&E representative if they brought copies with them today. Any response? All right, thank you. So, yes, we'll look into having some photocopies made, but we will have the presentation posted to the Web. And I appreciate your comment and feedback.

MR. ALBERT: Is there any reason why it could not be posted in advance of the meeting?

MR. LEAON: Well, this is a staff workshop and we are working with PG&E and Ecos in reviewing the report, and the report was not quite ready to be released prior to the

meeting, so, you know, I apologize for that, but we do have the report that will be available today and, in the future, we will make every effort to have these reports posted ahead of time. But, for this particular staff workshop, we were not able to do that.

MR. ALBERT: Just a point of comment, though, to realize that stakeholders that may be traveling to California from other places, and made a large investment in their time and money to come participate in these meetings, and it would be a much more productive use of our time if we were provided with materials in advance of the meeting. It seems like even 24 hours would have been something that could have been useful for us because we would have had access to those documents.

MR. RIDER: Larry, point taken. Thank you very much. And if you would just consider written comments as a result of this logistics issue, I think that would be very much appreciated.

MR. LEAON: All right, thank you. Next blue card, Robert Nachtrieb. I hope I didn’t get that butchered too badly.

MR. NACHTRIEB: Not bad, Nachtrieb. Thank you. My name is Robert Nachtrieb. I work for Lutron Electronics and I am the Vice Chairman of the Lighting Controls Section of the National Electrical Manufacturers Association, or NEMA.

I have been asked to make a short statement on behalf of member companies of the NEMA Lighting Systems Division regarding moving Lighting Controls Regulations from Title 24 to Title 20 of the California Code of Regulations. NEMA is pleased to have had the opportunity to work with the California Energy Commission, in particularly for the 2010 Rulemaking Proceedings Phase II on Appliance Efficiency Regulations. NEMA and CEC staff have had conference calls and one face-to-face workshop. As we move into the 45-day public comment period, I am confident that there will be few substantive changes suggested by NEMA to the proposed amendments to Title 20. And, looking forward to changes to Title 24, NEMA hopes to continue to have the opportunity to comment at the earliest stages. Thank you.

MR. LEAON: Thank you. Any other blue cards in the room? Okay, Ken, any questions on WebEx?

MR. RIDER: Just a second, let me open all the lines here. Hopefully, this is not too chaotic. Okay, so if anyone has any questions on the phone, if you would go ahead and say something, I suppose.

MR. LEAON: Any questions on the phone? Okay, all right, well, let’s proceed to the next presentation. We will hear from Pat Eilert with PG&E, and he will be providing some perspective on efficiency standards from the utilities.

MR. EILERT: Thank you very much for the opportunity to speak today. I would like to touch on three topics in my presentation, the first topic I'd like to touch on is just to provide a very brief overview of the investor-owned Utilities Codes and Standards Program. The second area I'd like to just sort of very briefly skip through is the sort of interaction between our policy between our program and the policy that is provided by various institutions here in the State. Given all the other discussions today, I will skip very lightly through those few slides. And then I'd like to just briefly address some recurring issues related to jobs in California and innovation.

So, let me begin by just going over what we do as investor-owned utilities in California. We collaborate to implement a single statewide program in California and we do this under the auspices of the California Public Utilities Commission, which approves both the activities that we conduct, as well as the budget that enables those activities. The first subprogram here is the Appliance Standards Program, and the two major areas of work in the Appliance Standards subprogram include development of co-proposals that we present to the California Energy Commission and then participation in the public workshops afterwards, in which we try to answer questions by both staff and industry. Since Federal Standards are embodied in

Title 20 Standards, we are also active in the USDOE Rulemakings.

The second subprogram that we coordinate around is for Building Codes. And I think it is fair to say that, in 2010, most of our advocacy work in California has been in this area in support of future 2011 Title 24 Building Standards. We conduct the same sorts of activities in this area as we do for Title 20 and, in an analogous manner, we're engaged in National Standards that affect California.

Now, the only way that we're going to achieve energy efficiency goals in California, of course, is to have regular updates to Building and Appliance Standards, and because of that, we have also implemented a Compliance Enhancement subprogram in this program cycle, which is 2010 to 2012, to support education and training for industry groups that are engaged in complying with both Building and Appliance Standards. Once again, most of our work in 2010 has been aimed at Title 24 Building Standards. In 2011, we expect to expand our work in the area of Appliance Standards, as well.

The final subprogram here is in Reach Codes, we provide technical support for local governments interested in adopting Building Standards that go beyond Title 24 Building Standards, the State standards. We have seen this curve once, what we have done just in the last couple of

weeks is just update the curve so that it goes up to 2009. On the right is this sort of disaggregated view of some accomplishments, and I think it sort of demonstrates the accomplishments of policy in California in a historical sense, just comparing California to the U.S. average. Going forward, we have to bend that green curve down substantially and do it very soon if we are going to achieve the goals here in California. Mr. Knox, I believe, will be talking about this fairly soon, so I am going to skip this slide.

So, this slide shows a representation of scenarios from the California Energy Commission's Integrated Energy Policy Report published in 2009, and it is a graphical representation of scenarios which include committed as sort of a baseline. And relative to 2020 goals, committed energy efficiency savings include savings from previous energy efficiency programs, as well as savings from previously adopted standards. The scenarios to the right assume that there will be savings produced from existing energy efficiency programs, as well as – it also includes assumptions for future adoptions in both Title 20 and Title 24 in the State. As you can see, the mid scenario from this IEPR reports falls short of achieving AB 32 goals, so we will have to work a little bit harder. I'm going to just basically skip this, except to say that Title 20 directly responds to California Public Utilities Commission's

strategic vision and goals, as well as their big bold strategies.

This chart here, and let's look at the top right chart, basically emphasizes the point that Commissioner Eggert and I believe can have both made if we look at miscellaneous plug loads here in the residential energy sector, there are large projected increases in those loads as we move forward in time. Additionally, if we look at the bottom right chart, miscellaneous plug loads, as well as office equipment, are also significant in terms of their impacts on energy use in the State, going forward. We will not meet zero net energy goals for either residential or commercial buildings if we don't address these issues, including, you know, office equipment, as well as consumer electronics. This extract from the California Long Term Energy Efficiency Strategic Plan just illustrates that there are fairly close links between the IOUs' work and that Strategic Plan.

I would like to say just a little bit here now about the issue of job creation in the energy sector. There is a recent, fairly important document that has been produced by the Haas School of Business at Berkeley, this paper looks at 15 other papers with respect to the issue of job creation in California. With respect to energy efficiency, the sort of walking around number that they produced is that there are

.38 net jobs produced for each Gigawatt hour of energy saved in California. And if we were to sort of use that number and apply it to what has happened here in California in terms of energy savings, between – just based on historical energy savings, the job creation would exceed the 300,000 net jobs by 2020.

And finally, another sort of recurring topic here is around innovation. There is a lot of legitimate concern regarding whether or not Standards have a negative impact on innovation, because innovation is really important to achieving goals in California, as well. So, here are a couple of charts which show patent activity and that it increases fairly substantially in response to the Clean Air Act and a couple of different categories. So, what this sort of suggests is that regulation could have a really positive impact on innovation, and empirically we see the same thing occurring around energy efficiency. What we find is that manufacturers are really good at responding to Regulations and are able to develop new projects shortly after new regulations go into effect, that help California out a lot. Thank you. Should I stay here?

MR. LEAON: Yes, if you don't mind, Pat. Thank you for that presentation. Do we have any blue cards in the room? Okay, seeing none, Ken, if you can come up to the podium and see if we have any questions via WebEx.

MR. RIDER: Sure thing. All right, the lines are open.

MR. LEAON: Any questions on the phone? Okay, thank you very much. Let's move on to our next presentation, where we will hear from representatives from the California Public Utilities Commission, Jordana Cammarata, and I hope I pronounced that correctly.

MS. CAMMARATA: Yeah, that was good. Thank you. Okay, hi everyone. My name is Jordana Cammarata and I work at the California Public Utilities Commission. I am a Regulatory Analyst in the Energy Efficiency Planning Section and I focus on Commercial Buildings in the Commercial sector and IOU Programs there, and also the Strategic Plan and some of the Zero Net Energy goals for California. And so, today I am going to talk a little bit about a couple of things, the Strategic Plan, some of the main goals there for Zero Net Energy with respect to the commercial sector, and plug loads, and then talk a little bit about the Zero Net Energy Action Plan that we recently launched, and give you guys a little bit of background on that, which also highlights some plug load issues, and then talk a little bit in general about Zero Net Energy and plug loads. So, this actually I probably will not since Bill Knox is here from CARB, I might not really dwell on this one, but this is just highlighting energy efficiency as a strategy in reducing our carbon

emissions, and also as an impetus for the Strategic Plan, as well. This slide talks about the major objective in the Strategic Plan, talking about market transformation, and defining that as a long-lasting, sustainable change in the marketplace where you can reduce barriers to the adoption of energy efficiency measures to the point where continuation of publicly-funded programs and intervention is no longer needed.

So, some of the big bold goals that we have in the Strategic Plan are focused on residential and commercial new construction, so one is all new residential construction in California will be Zero Net Energy by 2020; the second one is all new commercial construction will be Zero Net Energy by 2030; we have the HVAC industry will be transformed to ensure that its energy performance is optimal for California's climate, and then, lastly, all eligible load income customers will be given the opportunity to participate in low income energy efficiency programs by 2020. Of course, giving a quick definition as it is defined in our Strategic Plan, we use at the Commission, and I believe also that the Energy Commission uses a similar definition, that Zero Net Energy is when the amount of energy provided by on-site renewable energy sources is equal to the amount of energy used in the building, and so, basically as on-site electricity demand goes down, the

implementation of energy efficiency measures, you have that point where distributed renewable energy is increasing and these two points meet. There are a couple of different definitions for Zero Net Energy, you will definitely acknowledge that one, the Department of Energy has a few definitions up on their website, as well, but this is the one that we've been using.

So the Strategic Plan has a couple of major economic sectors and lots of cross-cutting areas. I'm not going to go through all of this, but basically the four major economic sectors are residential, commercial, industrial, and agriculture, and on the right-hand side are all of the cross-cutting issues, or areas. And I want to highlight a new one that we just adopted last month, was the lighting – adding a lighting chapter to the Strategic Plan, which wasn't there previously. This is a quick snapshot of what the Strategic Plan kind of charts and matrix looks like. You would have strategies on the left-hand side, so this is for Zero Net Energy Commercial Buildings for the new construction goal, we have got strategies on the side that help achieve that goal, and then designed with near-term, mid-term, long-term milestones on what are some of the things that need to be done to achieve that strategy, and it also highlights, which is missing, in between these two is an area of relevant stakeholders that are important to

engage to help achieve some of these goals, as well.

So this Strategic Plan, basically we have kind of transformed the Commercial chapter into a Zero Net Energy Action Plan. Through last year, I had probably three to four workshops on the two goals for Commercial, we had one workshop based on New Construction Zero Net Energy Goals, and then we had a second workshop based on the Existing Building Goal for 50 percent, getting 50 percent of Commercial buildings to Zero Net Energy by 2030, and then, from those workshops, we kind of tried to find out what actions do we need to do to help achieve some of the strategies and some of these goals. And so this Action Plan that was launched on September 1st was kind of the culmination of all that stakeholder input and the work that was done over the last year.

This is an example, again, of one of the strategies that we have in the plan and how we built it out to kind of include some champions, a champion network, these are people who are working in these areas already in their field, and have volunteered to help us champion some of the strategies that we have, and we have also identified through those workshops key actions, and what we need to do to achieve that milestone, so we just drilled down into this Strategic Plan and come up with actions, and also timelines, of course, which is really important for showing how we're

doing on that and progress.

This is a Progress Indicator, and so basically, let's go back to this, we figured out through a very simple calculation, and it's very simple, basically figuring out how many actions that we have identified for that milestone, how many are complete, and if they are ongoing, again, a certain percentage, and we divided it by the total actions available there for the timeframe of 2010 to 2012. So, looking at this, this kind of shows how we are doing on those milestones, and it is really quick, it is not weighted, and I am sure it could get more complicated as some things are sequential, but we have kind of just done this as a quick snapshot to help us know how we're doing. This is another example of a priorities strategy that we've identified for the Zero Net Energy Action Plan and it talks about mandatory energy and carbon labeling, and for this one, it's half-way complete, and this is referring to AB 1103, which is basically what the milestone had called for back in 2008, after that was passed, mandating benchmarking. And these are some of the champions that we have and some of the actions. And, again, this is a Progress Indicator and it kind of shows this strategy has four milestones and this is how we're doing regarding each one of them.

And then, in general, the whole Action Plan as a whole, this is how we're doing up until 2012, we are about

17 percent – or 13-17 percent on progress, and we hope to see more. Since we just rolled this out, we hope to see more progress over the next couple of years as we get this off the ground.

Okay, so Zero Net Energy and Plug Load, this last area I want to just try to highlight some of the connection. As Pat had kind of previously mentioned, plug loads are really important in trying to get to these Zero Net Energy goals, and I actually want to disagree with that and kind of say a little bit about these two. So, this is just basic definitional stuff, which I don't know if I need to get into detail with everyone in the room, but plug loads, they do not fall into traditional end-use categories, they are for both residential and for commercial, annual energy use estimates vary from about 15-20 percent for residential and 10-15 percent of commercial electric use, and three to four billion individual devices account for about 10 percent of the total U.S. of electricity use. Oh, gosh, this comes off kind of blurry on the screen, but this slide is talking about residential energy use and basically what I want to highlight, the change in residential energy use consumption for selected end-uses in the referenced case from 2008 to 2035, and basically just looking over that timeframe, we are expecting lighting to actually decrease, and other end uses such as microwaves, coffee-makers, security systems, and

video and audio equipment to increase over time, and this is, again, building kilowatt hours, you know, electricity – so this shows basically that the increase in electricity consumption are going to result from a proliferation of new electric devices over time. Electricity use for TV sets and set top boxes surpasses that for refrigeration-in this crowd; in 2010, TVs on the market today are very significantly, with respect to power draw, depending on technology and screen size. And lastly, you know, the increase of this other section is expected to average about 1.9 percent per year. This is, again, for residential.

And this next slide references Commercial and energy use, and it actually goes by percent per year, and it looks at commercial floor space, and so a couple of things I am going to say with respect to here, so purchased electricity use accounts for 59 percent for all commercial delivered energy consumption in 2035. The two bottom bar graphs, again, and I am going to be focusing on those two, one is other and the other one is office equipment, focusing on those buildings. And so the office equipment, as reliance on the Internet for information and data transfer increases, electricity for these other office equipment sector is going to go up. It would include servers and mainframe computers, and then, lastly, the other miscellaneous one above that is really focusing on video displays and medical devices.

Okay, this slide is focused on Zero Net Energy and the technical potential. This is a study that was conducted by the U.S. Department of Energy. It is also in our Action Plan as an Appendix, and it lists the depth of energy savings required by building type to achieve Zero Net Energy within the footprint of the building, assuming solar installation to create the required renewable energy. And basically the study indicates that achieving Zero Net Energy in certain building types will be fairly easier than others, and others are going to present some challenges such as hospitals and labs. On average, they are going to require a two-thirds reduction in energy use to approach Zero Net Energy goals, and you know, warehouses might be a little bit easier for unrefrigerated warehouses, and refrigerated about 58 percent. From a financial perspective, this is to try to get to our 50 percent Zero Net Energy for existing buildings, you know, achieving deep savings is really important in existing buildings, and it goes against the current paradigm of, you know, short payback times, and for something like this, it is clear that we are going to need to do a lot to be able to get to these emission reductions. So, you know, it’s going to require a change of thinking about these goals.

Okay, this is a graph that is kind of looking at end use in an office building, and it was from the California

Commercial End-Use Survey. It also highlights office plug loads. According to this study, office equipment accounts for 18 percent of a building's energy use, and the miscellaneous category that is up here, this five percent, includes other plug loads that aren't specified elsewhere, and the office equipment is for both small and large offices. And findings from this study, as well, highlights the urgency to addressing energy reduction opportunities in office plug loads. As improvements are made to HVAC and lighting efficiency through Title 24, office plug loads, if not addressed, will account for an even larger share of commercial electricity consumption.

And this graph kind of looks at average share of residential plug load energy use by product category. It shows that entertainment is 41 percent of residential energy use. We have IT, Information Technology, computers, laptops, printers, etc., are about 31 percent, and other – power tools, cordless phones, garage doors, lamps, and small appliances, represent about 28 percent of residential by product category. And at the bottom, it just says here, on average, plug loads represent 1,800 kilowatt hours per year of a typically household's electricity use, or about 17 percent of the household's electricity bill.

Then, these next couple of slides are just going to talk about what we have in the Action Plan that is actually

what kind of goes along with some of what we're talking about today, plug loads and Title 20. This is one strategy for the Goal 1, which is the New Construction Goal, and it talks about expanding Title 20 and 24 to address all significant energy uses and end-uses, and it talks about the milestone here, and these are some of the champions that we have for this strategy, three actually from the CEC, three of them I think are actually all here, and these are some of the actions and this is very much in line with kind of the process that goes along with expanding Title 20 and the timeframes are kind of constantly ongoing on the schedule that you guys – that Ken was referencing earlier. And this is the Progress Indicator that we have associated with this strategy to show how we are doing.

So what can we do? One of the strategies is 2-8, and this is a Priorities Strategy that we have highlighted and it says "to improve utilization of plug load technologies within the Commercial sector, test and deploy package of rebates, incentives." And voluntary industry agreement is the milestone, "to bring significant numbers of the best available technologies for managing plug loads within the commercial sector." Those champions here are Rich Lauman from Ecos Consulting and David Kaneda from IDeAs, and we have got a bunch of, again, more actions on what we need to be doing to get this. And so, what has been

going on with this strategy, particularly, is a lot of the champions have been meeting and actually trying to brainstorm what they can be doing to move this stuff along, having meetings, and just having some brainstorming sessions, is kind of the most up-to-date that I have been aware of for this strategy. And, again, this is the Products Indicator that is in the Action Plan, I actually have one with me today if anyone wants to flip through it. I didn't have time to print a bunch of them. And it is also available online.

And lastly, I'm going to end, these are just a few things that I want to mention for Zero Net Energy and plug loads, these are some ideas and recommendations, aggressive consumer education on the energy use of office electronics, promotion of office electronics, electronics whose power management features cannot be displayed, promotion of high efficient products, and of high efficient power supplies, use of Smart Plug shifts, and other automatic controls. There are also some other ideas, additionally, future program and policy design could include in the future, rebates could be designed for office electronics that ship with automatic controls, enable to power the device down to a lower power mode when not in use, Smart Plug strips and bearing design, but typically in place some combination of load centers and remote controls and timers. Additional

research is underway, as we are finding out through these studies to actually help understand and to quantify the energy reduction potential from these devices, and results from these studies can help inform policy makers such as many people in the room, about priority products ready for new mandatory standards for voluntary specifications. California has led the nation in mandating power supply efficiency, but for certain products the bar could be raised even higher through widespread implementation of power supply efficiency programs such as Energy Star, Ad-Plus, and Climate Savers. Title 20 could address some commercial plug loads that are increasingly ready for Standards considerations. So, thanks everyone. And I am ready for any questions any of you might have. And here is our contact information, I am here with my colleague, Ayat Osman, who works in the Codes and Standards, she is the Analyst for Codes and Standards in Emerging Technologies, and she has been helpful with putting this together. And lastly, the Action Plan could be found on Guage360.com, which is an energy efficiency web portal that will be launching, I think, in the next month or so for California.

MR. LEAON: All right, thank you very much, Jordana. Do we have any blue cards in the room? Okay, I see one. Okay, Wayne Morris, if you could come up and, for the record, state your name and organization.

MR. MORRIS: Good morning. My name is Wayne Morris. I am with the Association of Home Appliance Manufacturers and I just want to thank Ms. Cammarata for the presentation. I am a little bit surprised that you did not mention one other thing in terms of the plug load because it is something that I think California can be very proud of, and that is that California was one of the signatories to the combined agreement that was reached between the energy efficiency advocates, the appliance manufacturers, and the Department of Energy, on new energy efficiency standards for a large number of products. This multi-product agreement, which is now moving through the necessary processes at the Department of Energy, will call for new standards in a number of different product categories, including refrigerators of different types, dishwashers, room air-conditioners, freezers, clothes washers and clothes dryers. This particular rulemaking and exercise and agreement that has been reached will take, for instance, a typically 20-cubic-foot refrigerator and freezer on top would use about 390 kilowatt hours per year, which is down from 900 kilowatt hours in the 1990 and down from about 1,700 kilowatt hours in the early 1970's. Some people have said, including a statement from the Appliance Standards Awareness Progress, that, in fact, this particular agreement will save more energy than all of the National Appliance Energy

Conservation Act has saved up until this time. The agreement will save approximately $2.2 billion for consumers in the State of California, and about 20 percent of the entire load used by households here in California, so it is a very significant breakthrough. It was done in a cooperative fashion, which is something that I think sets the stage for future activities. I think that it is something that California has been very active in since the very beginning, and I would hope that California would take pride in being part of this agreement. Thank you.

MR. LEAON: Thank you very much. Do we have any other blue cards in the room?

MR. RIDER: Again for the record, this is Ken Rider. I just had two quick clarifying questions. Those progress bars that you were showing, were those – and maybe I missed it, I don't know if I could see the Axes, were those for all the way to 2020? Or were they –

MS. CAMMARATA: No, they were for 2012.

MR. RIDER: So we are actually not very far in terms of getting to the – we have a few years, but I just – okay, thank you. And the other thing is, we are talking a little bit about battery chargers today. Would that fall in to the "other" category? And do you know if that is included in the "other?" Or –

MS. CAMMARATA: Oh, within those graphs? Yes, I

believe that would be in “other.”

MR. RIDER: Okay, thank you very much.

MR. CAMMARATA: Thank you.

MR. LEAON: Okay, Ken, if you could check WebEx and see if we have any questions on the phone.

MR. RIDER: All right, the lines are open if you have any questions on the phone.

MR. LEAON: Any questions from the phone?

MR. MCHUGH: Yes, this is Jon McHugh. Jordana, do you have particular goals in terms of gigawatt hour-type goal savings for appliances that you all are projecting?

MS. CAMMARATA: Not currently, no, we don’t.

MR. LEAON: Okay. Any other questions from the phone? All right, thank you very much, Jordana. Let’s move to our next presenter. And for our next presentation, we will hear from Bill Knox. Bill Knox worked in both the private and public sector in energy efficiency and renewable energy for over 20 years before joining the Air Resources Board. He worked for the California Energy Commission in the 1990’s, then had a front row seat for the 2001 energy crisis as a natural gas supplier to UC and CSU campuses, state agencies, and local governments. In 2002, Bill and colleagues formed the nonprofit Valley Energy Efficiency Corporation and successfully ran a regional energy efficiency program in Yolo County. At the Air Resources

Board, Bill is the point person for electricity and natural gas issues in the Office of Climate Change, and provides technical support on electricity issues for the Cap and Trade Program. Welcome, Bill.

MR. KNOX: Thank you, Mike. It is really good to be here this morning. Good morning, everybody – it is still morning, I think. I did work for a long time at the Energy Commission and also ran a Yolo County Energy Efficiency Program before; a couple of years ago, I switched over to the Air Board. And I am here today primarily to provide sort of an Air Resources Board perspective on the importance of the Appliance Efficiency Program.

Let's see, I'm not really going to take these bullets in order, but just want to give a little background first. AB 32, the California Global Warming Solutions Act of 2006, required the Air Resources Board to develop a Scoping Plan, a plan for how we were going to reduce greenhouse gas emissions back to 1990 levels by 2020. And in developing that plan, the Air Board relied greatly on the support and the analysis done by both the Energy Commission and by the Public Utilities Commission in order to formulate our strategies in the electricity sector, including energy efficiency.

Energy efficiency is really a cornerstone of California's climate protection strategy. Up to 15 percent

of the total greenhouse gas reductions that we need to meet our 2020 goal can come from energy efficiency, and possibly even more. As mentioned by Pat and others, energy efficiency is one of the lowest cost ways of reaching our greenhouse gas emission reduction goals. And it's a very important way, along with conservation and distributed renewable generation, reducing the electricity consumption, as seen from the supply side of the grid, both consumption and demand. By reducing demand, we don't have to build as many new power plants, be they gas or renewables, and we don't have to build as much transmission. So energy efficiency not only is the cheapest way of getting carbon emission reductions, but it also makes the other ways cheaper, as well. Now, there are some other cheap ways, as well, for example, requiring higher miles per carbon -- or miles per gallon -- in cars and switching to less carbon intense fuels in cars and light duty vehicles.

But at any rate, our Scoping Plan, because we had this collaborative relationship with the energy agencies, you know, we worked with the Energy Commission based on their plans for improving and making the Appliance Standards broader and stronger in the future, and so we called out in the Scoping Plan the need for appliance standards to address televisions, and that has been done, consumer electronics, in general, and then particularly battery chargers and

rechargeable battery products.

So why battery chargers? Why are we focused on that today? Well, I think that the previous speakers, Pat and Ken and Jordana, probably have a lot more information than I'll ever have on this, but certainly rechargeable battery products are a major driver of plug loads today. And I understand from the Case Report that's just released, I guess, today that battery charges use as much as 7,700 Gigawatt hours per year. And I think that the Case Report also suggests that there is the potential to cut that by almost 40 percent. And if we do that, that can reduce greenhouse gas emissions statewide by well over a million metric tons of carbon dioxide per year. And I think it is actually probably, if you were going to round it, it's probably closer to 2 million, which is the equivalent of taking more than 100,000 cars off of the road.

I think from the Air Board's perspective, energy efficiency is critical, other ways of reducing demand are critical, and there is something particularly important about appliance efficiency that I think kind of follows out of what you've heard from the other two speakers today. We have talked a lot about zero net energy buildings and that is really critical, although it is difficult to do with existing buildings, so that tends to be primarily a strategy for new buildings of various kinds. On the other hand, in

the short term, between now and 2020, and probably even up to 2030, there is a greater potential for savings by reducing energy consumption in existing buildings, and clearly, appliance energy efficiency is a very important and key part of reducing energy usage in existing buildings.

So, what's next, or some of the things already planned by the Energy Commission, continuing to address other forms of consumer electronics, further addressing small home appliances, especially in light of what was noted in terms of the agreement with DOE and the industry on that. And then, of course, office equipment for commercial buildings, a very fast growing area of energy use in office buildings. And then, of course, besides plug loads, there are other things on the horizon that are very important, as well, appropriate heating and cooling systems for the diverse climates of California. Perhaps taking the Zero Energy building strategy that is really a transformative and overarching strategy that was really first developed in the PUC's Long-Term Energy Efficiency Strategic Plan, you know, continuing to focus on that, but perhaps also using the Zero Energy building concept as what we are really trying to get to existing buildings is to approach that, and we may not be able to get there, but if we can get 10, 20, 30, 40, 50 percent, there is a huge potential there, and in the short term, we really need to do a lot of that. And then,

finally, what's next? I think the other thing that is really important is to continue to work to devise program strategies that will be able to reduce electricity demand, natural gas demand, and usage, both usage in kilowatt hours and demand in kilowatts, because we need to be able to use our electricity for vehicles as the fleet of electric and plug-in electric vehicles grows, so it's really important to continue this kind of work to reduce the energy consumption of battery chargers and appliances of all kinds. And then, finally, I'd like to finish just by saying that, as a parent, I feel that we really owe it to future generations to try and to mitigate as much as we can the potential disastrous consequences of climate change. And that's why I do the work that I do and that's why I so much value also the work being done by my colleagues here at the Energy Commission and at the PUC. Thank you very much.

MR. LEAON: Thank you very much, Bill. Do we have any blue cards in the room? Any questions in the room? Okay, Ken, if you could check WebEx and see if we have any questions from folks on the phone.

MR. RIDER: All right, the phone lines are open.

MR. LEAON: Okay, do we have any questions from folks on the phone?

MR. MCHUGH: Hi. This is Jon McHugh. Bill, for your greenhouse gas plan, do you have particular goals set?

I know you have different goals set for overall data energy consumption and consumption of buildings, do you have particular goals, plans for appliance efficiency standards?

MR. KNOX: No. At ARB, first of all, we work very closely with the energy agencies and I think that, at the time that we put together our Scoping Plan in 2008, it wasn't exactly clear what we could expect from energy efficiency, or from different sectors such as utility programs, appliance standards, building standards, and there's been a lot of work done on that recently, including the work of demand forecast energy efficiency quantification workgroup that tried to look at how committed and uncommitted efficiency affected demand. But essentially, the type of work that Jordana was outlining today is what will lead to new and better estimates of where that potential lies and what kind of programs can reach the levels of energy efficiency and conservation that we need, and I hope that at least partially answers your question.

MR. MCHUGH: Yes, it does. Is there a follow-on study or something that then tries to quantify that to help refine the Strategic Plan?

MR. KNOX: I can't really address what's coming next with the Strategic Plan, but in terms of our Scoping Plan for reducing carbon emissions, the Scoping Plan is to be updated every five years, and so it will be updated in 2013.

And the other thing, of course, is we have to look at – we've come through and we're still in a major recession, which has changed sort of baseline expectations for the future. So, all of that stuff has to be brought together, you know, by the time we're ready to look at the numbers again, and publish what we expect. And one other thing I'd like to say is that, you know, ultimately we don't – nobody can predict exactly what sort of emissions reductions we're going to get from energy efficiency or from electric vehicles, or from biofuels, if they devise a way of making biofuels from algae or something. But we also have to be considered in December by our Board a potential cap-and-trade regulation that would set a firm cap on emissions, and so we feel that we'll be able to achieve the goals, whether or not we can a priori say exactly how much is going to come from which strategy.

MR. MCHUGH: Thank you very much.

MR. RIDER: Jon, one more thing, I'm fairly sure that there is some broad – very broad, non-specific amount of energy savings in the Scoping Plan. Again, all the documents we've been talking about, the Energy Action Plan, the IEPR, the Warren-Alquist Act, all these documents are available on line for everyone out there.

MR. LEAON: Okay, do we have any other questions from the phone. All right, thank you very much, Bill. We

appreciate your presentation. Next on the agenda is Suzanne Foster Porter, and we are getting to the crux of the workshop today; Suzanne will be talking about the Case Report for Battery Chargers, and this morning's presentation, we were attempting to set the table, providing a broad policy background discussion, which highlighted the importance of energy efficiency for a number of State goals, including meeting AB 32 GHG reduction goals, complying with our loading order adopted by the Energy Commission, which helps to reduce the need for new power plants and transmission lines. And battery charges, based on their energy usage, represents a potential large energy savings and we will hear more about that from Suzanne in her presentation, so I can ask Suzanne to come on up to the podium.

Suzanne is a Senior Manager with Ecos, Research and Policy Department and is a technical consultant to PG&E on the energy efficiency of battery charges. She co-authored the 2008 CEC adopted Battery Charger Energy Efficiency Test Procedure and the PG&E Case Report for Battery Chargers. She has focused on uncovering cost-effective energy savings opportunities on behalf of clients since 2002. And with that, I will turn it over to Suzanne.

MS. FOSTER PORTER: Thanks, Mike. A question about the schedule. It is 11:25 and I think the agenda indicated

that we would wrap up around 12:15, so I was looking for guidance from you on if I should try to stay to the 12:15 or run a little over, it looks like we are a little behind.

MR. LEAON: Yes, we are running a little behind. Are there any objections in the room to us running a little over? Okay, seeing none, yes, please proceed with your presentation as planned and, if we need to go a little over, that is okay.

MS. FOSTER PORTER: Great, thank you. Before I get started, I just wanted to mention a correction to the agenda that you have in front of you, which is that, although Ecos had a significant contribution to this report, it is a PG&E Case Report that was developed in close collaboration with other investor-owned utilities, and so I would like to acknowledge, in particular, Pacific Gas & Electric, Applied Technology Services Group, the California Energy Commission, Public Interest Energy Research Program, I think that Brad Meister is here today, who manages that work, Southern California Edison had an important contribution to this report by submitting data for industrial battery charges, as well as providing technical information on the technology. In addition, the Electric Power Research Institute did a significant amount of research under the funding from the Energy Commission that contributed to the technical findings of this report, so this is a – I'm up here today presenting

information for the IOUs, but it's been a long effort by a number of organizations that deserve acknowledgement.

I am going to talk today about the technical and market background for battery charges. We are going to look at the battery charge test data and some of the things that we uncovered as we started to test these charges. In addition, I will overview some strategies, technical strategies, to improve battery charger efficiency, the PG&E proposed Title 20 Standards, and then wrap up with a summary with some of the key highlights. And this is going to be a fairly technically dense presentation compared to those that we have seen before. I just ask that, if you have questions, please jot them down and, in order to stay on time, I would just prefer to take those either at the end, or at a session later this afternoon. I do want to answer everyone's questions, but I also want to make sure that blood sugar does not drop below low levels and people get a chance to go to lunch.

We heard today from the previous speakers about some of the details. I think Mr. Rider highlighted a lot of the efforts that have been underway, so I won't take the time to go through all of these now, but just want to emphasize that battery charger energy efficiency research for small chargers has been underway since 2002, and for large chargers since 1998, plus procedure development started at

Southern California Edison Labs at that time. Since that time, PG&E has picked it up as an opportunity for standards in California, as has the DOE, which is shown in the lower part of this slide.

We've heard a lot today about how much energy battery chargers use and I'd like to just talk a little bit about why they're an important piece of the plug load policy strategy. The figure that you have in front of you illustrates kind of the realm of plug-in products that are in use in people's homes and offices and industrial facilities. There are two common denominator components to plug load products, generally speaking; there's power supplies, these are devices that convert the wall voltage, Alternating Current, to the low voltage Direct Current that's needed to operate many of our integrated control circuits and other elements of plug loads today. There are two types of power supplies, internal, shown on the lower left, and external, which is just a physical distinction between where the circuitry is located. In addition, many of these products had battery charges. These battery chargers can be used for providing portable power to consumers for driving motive equipment and, in addition, plug loads can be divided within these two categories. This initiative on battery chargers is a horizontal policy approach, which light external power supplies is meant to

improve the efficiency of a wide variety of products that contain battery chargers. The CEC adopted an external power supply standard, which is represented –- and the DOE and other parts of the world adopted a standard – represented by the blue horizontal element here, which is the external power supply strategy. A battery charger strategy here is shown in green, which is what we're talking about today, which is mean to say many plug loads have battery chargers, it's very difficult to address each individual product on its own, but if we take a multiple product approach, we can improve the efficiency of a wide suite of products simultaneously. And in California, that number is about 170 million battery chargers. We are not talking today around some other strategies that the CEC recently pursued on TV's, which is in this orange internal power supply category; those are plug loads that are large enough per unit used in and of themselves to warrant an individual standard, and so those types of products are things like televisions, set top boxes, computers, and other large plug loads, but we're not really talking about those today, today we are talking about the horizontal approach to address many small products.

The number of battery chargers, particularly in the consumer realm, continues to increase and new products are routinely added. MP3 players are a recent example of a portable power product that many people enjoy that weren't

available five years ago, so this standard is meant to address the increasing number of portable products that we have and carry around with us. The battery charger standards that we'll talk about today in the PG&E proposal address a wide variety of battery energy, from 10's of watt hours to thousands of watt hours, and so, as a necessary component of that, we have broken them up a little bit into different product classes because there are some unique elements to these products, but they generally have all the same function. They include a power supply, which converts high voltage Alternating Currents from the wall to low voltage Direct Current needed to charge a battery. They have charge control circuitry that regulates the current that goes into the battery and, in addition, they have a battery that stores energy, and these are sort of the three fundamental components of battery chargers.

In addition, battery chargers have three primary modes of operation, active in charge mode, maintenance mode when the battery is full, but connected to the charger, and the battery is being topped off from time to time to ensure that there isn't sort of too much self-discharge, particularly for some chemistries, and lastly, there is a no battery mode, which is when you take that battery and you pull it out of the charger entirely and the charger is still plugged into the wall. And these are represented by high

power, typically, in active mode, lower in maintenance, and even lower in no battery, although that is not universally true with Current products, but this is sort of an example of what you might expect.

In addition, battery chargers come in a wide variety of foreign factors, so they are not always – those three components that I talked about with power supply and charge control and battery, are not always found in the same housing, or in the same location. Up in the upper left-hand corner is an example of a product, it is portable commercial radio, the external power supply where the power conversion occurs is separate from where the charge control circuitry is, which is found in the base. The battery housings themselves actually are inside the product, and so that's one example of a foreign factor. There are various – foreign factor 2 and 3 are different ways that the power supply and battery and charge control can be located, but also, if we just focused in on foreign factor 4, sometimes the power supply, charge control, and battery are all found in the same product, and this is an example of an emergency egress light, which is located in buildings where the battery is primarily used for back-up in the case of power outages.

Battery charges not only vary widely in their energy use, they also vary widely in the number that are used in

California. So, these are both logarithmic scales on the vertical and horizontal axis. There are some products that are typically used by consumers, where there is a wide number of products in use, but they tend to use very low energy per unit. An example of that is a cordless phone. Other products like three-phased forklifts that are used in industrial facilities tend to have a small number of units in use in California, but their energy use per unit is quite high. So, the orange dots that we are showing here are sort of those that represent the highest energy use and number of units, whereas the blue dots represent other battery chargers that make up the scope of this proposal.

Today I'm going to talk about a proposal that breaks the products up into small battery chargers and large battery chargers. They have different characteristics. The small battery chargers tend to have their batteries and chargers still together, rather than separately. Their usage patterns vary widely because there are so many different end use products. Price and portability tend to drive these markets for small chargers, sometimes products need to be very inexpensive, other times the priority for the market is to make a very portable and compact charger. In addition, the significant savings potential for these products is in charge and battery maintenance. Larger battery chargers are typically not sold with their

batteries, so these are forklift chargers, moving equipment used in airports and so forth, so the battery is procured separately from the charger and they tend to be used more heavily because they are used in industry where you're constantly recharging and using the product, and there is significant cost and energy usage for charging these products regularly and so there is already some efficiency gains in this market compared to the small battery charger market. And so the cost effective savings we see here is more in the active mode and it is associated with the efficiency of the power conversion from Alternating Current to Direct Current, as well as the charging behavior and ensuring that that product is charged effectively regardless of the depth of discharge. There are some other elements here on the table, specifically the dominant charger technology differs for small and large chargers, which I will talk about in a moment. The efficiency metrics that we're proposing in the Case Report are different, the test procedure is different. You can see there is a wide variation in the stock, most of the stock numbers are in the small category, but their energy use is about the same. The savings that we'll get from small chargers is much greater as a percentage of total usage than for large.

I also want to highlight an important distinction in the context of the USDOE rulemaking, which is focused

primarily – or, I should say, exclusively – on consumer chargers. So, the USDOE is moving forward with the rulemaking that I mentioned early in the presentation on consumer chargers. This Title 20 Case Report that will be, I guess, published today, but that I'm overviewing here, includes both consumer and non-consumer chargers, and specifically the small chargers have both consumer and non-consumer products, and the large chargers are non-consumer only. So, we're recommending that we look at standards for both categories.

The Standards Proposal was developed with more than 100 products that were tested to inform the Standards Development, both small and large. Many of those came from Southern California Edison's labs, others were tested in the Ecos Lab with PG&E, under the PG&E project, some data reviews from the California Energy Commission PIER project. It includes a wide array of products, including cell phones, cordless phones, lawnmowers, digital cameras, forklifts, it includes a wide array of battery capacities, charger topologies, which is basically the charger circuit design, as well as voltages. So, we tried to really find a broader array of chargers to ensure that whatever standards we proposed were suitable for these wide array of products.

I just want to say something briefly about the test procedure. Mr. Rider mentioned that the current – that the

CEC adopted a test procedure in 2008 that addressed both small chargers and large chargers. I have highlighted in yellow here that the test procedures that are probably most relevant to us, this is an overview of all of the battery charger test procedures that are available today. So, the current test procedure for Energy Star, and the Canadian Standards Association, and the DOE, is a test procedure that was originally developed by Energy Star for their program. It addresses maintenance in no battery mode, and this is a test procedure that doesn't include active, but it's something that DOE is moving away from and Energy Star has announced that they're moving away from, and so there is a forthcoming method that's likely to be more in alignment with the Energy Commission method that was adopted in 2008; the final rule for that has not yet been issued, we expect it in December of this year, or January of next year, and I think we'll get some more information on that on Wednesday at the DOE meeting. But we expect it to be more in alignment with the CEC method, which measures charge, maintenance, and no battery modes – altering modes. And it's not exactly clear, I just want to be clear that we're not sure that it's going to align directly with the CEC, but it's clear that they're looking at active mode very carefully.

Then, the last column on the right is the adopted

CEC method, and I just want to highlight that there are more direct measurements with the large chargers and that is because there are more – the products are more efficient and more in-depth testing is required in order to uncover the differences among them.

The results for the consumer charges and small chargers vary over a fairly wide range, and I should say something about the testing. The test procedure used to collect our data was Part I of the California Energy Commission test procedure, and that test procedure has three key measurements, 24 hour efficiency, which is a measure of how efficient the product is charging the battery, maintenance mode power, which is when the battery is connected to the charger, but it's totally full, and no battery mode power. Twenty-four hour efficiency ranged amazingly wide from less than a percent to 70+ percent. The tested products average about 21 percent. If you look at the Energy Weighted Annual Average, which is one way to look at the average, it's about 10 percent efficient over the charge mode. The maintenance mode power for the small chargers range from a tenth of a watt to 170 watts, no battery mode ranged from less than a miliwatt to 70 watts, and off mode, which is quite rare for products, had some range from miliwatts to a few watts. So, what this suggests is that there is lots of opportunity for savings because

many of the products are not that efficient and there are examples of products that are doing a much better job at adjusting the power consumed to the utility that the device provides.

Here's an example of two power tool chargers, both with lithium ion batteries, with different 24-hour efficiencies, 24 percent for the left-hand product, and 43 percent for the right, and variation and maintenance powers, so we see that efficiencies are varying quite widely, even within similar products and identical chemistries. In addition, what we found in our dataset is that utility or consumer features do not necessarily trend with efficiency, so here's an example of a product on the left, this has a very slow charge time and it's less efficient than some other products we found in the dataset. The 24-hour efficiency, which is a measure of the charge efficiency, was about six percent, the maintenance mode power was 10 watts, and the no battery mode was just under two, whereas the product on the right is a faster charger and it has a charge time of approximately one hour with a 60 percent efficiency and with a maintenance mode and no battery mode of less than a watt. In the dataset, I also want to highlight that there are examples where this is switched, so some slow chargers can be very very efficient, whereas also fast chargers can be inefficient, but what we saw is there wasn't a clear

trend in terms of rate of charge, as one example, with efficiency, that that seems to be quite independent in the current market.

High battery maintenance mode power is one of the opportunities I mentioned for small chargers. This is particularly dramatic for high power chargers like this golf cart. So this is a typical 24-hour test, power is shown on the vertical axis, time is shown on the horizontal axis, and this is an illustration of the way we typically conduct the test under the CEC test procedure. So the battery is fully discharged and then you put the battery as it is fully discharged onto the charger. The charger then proceeds to charge the battery from zero discharge all the way up to – excuse me – to 100 percent depth of discharge all the way up to totally full, and in that process it gives – delivers – Direct Current to the battery, which is shown in the blue here. The particular element I wanted to highlight is this charger doesn't have the ability to recognize when the battery is full and it energizes – it's a fare or resident charger for golf carts – and the energy associated with energizing the circuitry, even once the battery is full, is still over 200 watts, so if this product is plugged in, it's using about 200 watts in battery maintenance, even though we do not measure any direct current going to the battery.

I will say a little bit about the industrial or

large charger test results. We have 47 tests on 15 chargers, these were performed, as I mentioned earlier, by the PG&E Test Center, Southern California Edison, and then Amatek, which is one of the manufacturers that supply data to the Energy Commission during its data call for the test procedure. And these results vary over a narrow range and, as I mentioned before, because there has been some pressure to improve efficiency for these chargers, they are generally more efficient than the smaller chargers. There's about 20 percent variation in power conversion efficiency from 74 to 93, about 30 percent variation in what we call charge return factor, which is a measure of how well the product charges the battery at different depths of discharge, so if you put a battery on a charger and it's 30 percent discharged, how well does the charger know to just charge it to 100 percent and stop, or does it overcharge it or undercharge it? That is what charge return ratio is measuring.

Small improvements in this category of chargers add up to a lot of energy because each product uses about 40 megawatt hours per year, and we saw a wide variation in maintenance mode and no battery mode from tenths of a watt to up to 300 watts. It shows room for improvement. And as I mentioned before, there is a more elaborate test that is used to test these products because they are more efficient and a little bit – we have to make a more rigorous test

procedure to find the differences among them, but it's worth doing because they use so much energy per unit.

I'd like to say a little bit about technical improvements to battery chargers. A lot of what I'm going to talk about in this presentation is pulled from a study that was authored by EPRI. It was done under some work for Mr. Brad Meister under the Public Interest Energy Research funding. And it is *A Technical Primer for Designing and Improving Battery Charger Systems*, and it is available at efficientproducts.org for those that would like to review it in greater detail. I'm going to pull out a few examples here today. There are four dominant battery chemistries that we find for all chargers, lead acid, nickel cadmium, nickel metal hydride, and lithium ion. They have different characteristics. As I mentioned before, some batteries have high self-discharge and some have low, and what that means is, if you put a battery on a shelf and let it sit without being charged, some will self-discharge at a slow rate, and others will just self-discharge at a high rate. This is important when you're looking at battery maintenance power and how high or low it needs to be in order to ensure that the product stays charged, the battery stays charged.

In addition, there are still advances that are being made in some chemistries, other chemistries are more established, specifically lead acid and NiCd are more

established. The energy density, which is a measure of how much energy you get from the battery compared to its weight varies, and this means that different choices are made for battery chemistries, depending on the application. Prices vary and toxicity level vary, as well. And so it was important for us to take into account all of these characteristics of the batteries and why they're chosen, including the price when considering standards. There are four key topologies or battery charger types, and there are a few others than this, but I'll focus on these four dominant ones for now. Linear and switch-mode are similar to linear and switch-mode technologies found in power supplies, they tend to be used with smaller chargers, consumer and non-consumer, fair resident and silicon controlled rectifier are the dominant technologies found in the larger chargers today. Their typical efficiencies vary over a range, depending on the power application and the specific design, but these are meant to give you a basic indication.

There are a number of ways to improve linear charger efficiency, which is one of the dominant technologies found in consumer products, consumer and non-consumer small chargers today. One obvious opportunity is to use the full wave rectifier instead of the half-way rectifier to change the alternating current to direct current, and it can

improve your efficiency pretty quickly that way, including more sophisticated charge controls, such as voltage and current controllers. You can replace linear power supplies with switch-mode power supplies, which tend to be more efficient, and you can substitute the entire linear battery charger design with a switch-mode design. So, I'm going to go through some of these details right now as an example of the way to improve a small charger.

Here's a power tool charger. It's somewhat typical in terms of its efficiency that we observed in our test dataset. What you have in that black case is on the left-hand side. The front part of that case has been removed, so you can kind of see two – you might not be able to see it because of the rendering on the screen, but there are sort of two slots that batteries can go into, and what we've done for the purposes of this picture is to pull out the circuitry that was kind of tucked inside that case in order to expose it, and then there's the external power supply to the right that converts alternating current to direct current, and the charge control circuitry is located on that little board that's basically found in the charger cradle that the batteries plug into. This particular charger has a linear power supply, so it's a magnetic core with windings and then a resistive current regulating element. And although this isn't a diagram of this particular charger,

this is an example pulled from the Technical Primer that I just mentioned, where you have a linear power supply that's about 35 percent efficient, a resisted regulating element, and the estimate of the efficiency over the 24 hours is about 10 percent. So, this is somewhat typical of many consumer chargers that we see on the market, primarily because these chargers are driven by price point, so manufacturers are trying to reduce the number of components and bring a very economically priced product to market.

If we replace the linear power supply with the switch-mode power supply, as might be done with the external power supply initiative, you can increase charger efficiency by about 15 percentage points because you put a super efficient switch-mode power supply on the front, and you still use the resistive regulating element, you're going to be losing some energy in that resistive regulating element. And what you have with the resisting regulating element is what's shown here, and it's not the same product, but it's the same type of technology, by the blue line, which is a product that has a very – doesn't have sophisticated charge control in order to be able to shut down the battery, and so it continues on for a while and then drops off when the battery is pulled out, but there's no distinguishing between active mode and charge mode in terms of the energy that's being drawn to the wall, and when you compare that to the

utility that's being delivered to the battery. An example of a different design that does have Smart control technology -- primarily because the chemistry requires it in this case – is the green line, which actively monitors this charger, actively monitors when the battery is full, and then shuts off. So, if you move to a transistor-based regulating element with Smart controls, that is, a control that can sense when the battery is full and shut down, then you can improve your efficiency further. So, we started at 10 percent, we moved to 25, and now we're looking at a basically 34 percent efficient charger. And if we even go further to improve the charge control by making it switch mode charge control, we can make this charger 50 percent efficient. So, this is just an example of the different incremental steps that can be made to improve efficiency for small chargers. And I wouldn't say that all of these steps are appropriate and cost-effective for all chargers, but this is the suite of things that can be addressed. The average efficiency that we're going to talk about in a minute for the standard is about 40 percent, so we're actually not – it may not be necessarily required that you go to a switch mode DC to DC converter for charge control. But we do find examples of this in the marketplace, this is an example of a charger, and we've opened it up. It's an external power supply with charge control circuitry inside,

and you can get 50 percent efficiencies observed in the market today where portability drives the market.

I just want to say something briefly, there is silicon controlled rectifier chargers, some strategies to improve those on the large charger side is by switching at higher frequencies, and then a ferroresonant charger which is a charger technology typically found for large chargers. There's an opportunity for hybrid technology, optimizing the magnetic flux coupling the transformer, and this is a little bit outside my field, but Southern California Edison is really the expert on this.

Here's an example of that same charger that we saw before, two chargers that are fairly similar, where we could reduce battery maintenance mode for ferroresonant chargers, and this is a test that was conducted by EPRI and you can see the blue line is the charger that has what they're calling a cut-off circuit, which senses when the battery is full, and takes the battery maintenance to zero, and then a charger without, which is what we saw earlier. So there are big opportunities to reduce maintenance mode even for large chargers.

So, in summary, there are opportunities to improve efficiency across a wide range of topologies, anywhere from 10-20 percent for improvements across all topologies, to get within the range of the standard that we're proposing.

And now to the proposal. The scope includes consumer and non-consumer chargers, it includes large and small battery charger systems, and the proposal is to have a two-tiered approach for standards for large chargers, and a single tier approach for the small chargers. We're proposing a multiple metric, which would be a 24-hour charge and maintenance efficiency, a maintenance power, no battery power, and a power factor requirement for small battery chargers. For large battery chargers, it includes a charge return factor, which I mentioned was a measure of how well the charger tailors its charge to different dumps of discharge, power conversion efficiency, which is how well it converts the alternating current to direct current, power factor, maintenance power, and no battery power. And these standards are based on the test procedure that was developed through funding from Pacific Gas & Electric and the Public Interest Energy Research Group that was adopted by the commission in 2008.

The effective date that we've put forward in the PG&E proposal is 2012 for the small chargers, and 2013 for the second tier, the large chargers. So, just to be clear, let me restate that – the effective date would be 2012 for the first tier of large chargers, and for the single tier, small chargers; and then 2013 for the second tier of the large chargers.

The reason why we're proposing multiple efficiency metrics over an annual energy use metric for chargers is primarily because of the nature of the product that we're proposing regulation for. Just like external power supplies, which have not worldwide had an annual energy use metric, battery chargers are used with a wide variety of products and a wide variety of duty cycles, and so it's very difficult to predict what a particular duty cycle is. This is complicated by the fact that data are not available on duty cycles, and even if they – and when I say "duty cycle," I mean the way that the product is used, so even if we did have data on the way the product was used, the expectation is that that data would vary so widely that the deviation within that would be very very high. And so that's why we're proposing multiple metrics that address the energy use in each mode of operation to ensure energy savings regardless of the way that the battery charger is used by the end user. The multiple metrics include charge, maintenance, standby, and power factor.

I'm going to start with an overview of the small charger standards, there are three classes of small chargers that we proposed, and I'm using the word "classes" in part because that's the language that DOE uses, but you could call them "groups." There's one general class, which is for most small chargers that we'll be talking about, and those

that you think about, and then two small classes, one for emergency exit signs, which have special consideration because of lighting requirements for safety, and another small class for inductive chargers, which have, again, special utility and safety considerations, including corrosion of metal contacts in the wet environment. They tend to be used with toothbrushes and shaver, and the like, that are used in a wet environment. All other chargers fall within the general standards proposal, and the standards proposal is meant to be appropriate enough that many sort of co-functions or functions of the battery charger other than charging batteries can fit easily underneath this energy efficiency requirement. That includes LED lights, indication of charge, clocks, and other functions. The test procedure does require you to turn off all other functions that are possible to be switch selectable by the users, so we are not accounting for those in these standards proposal.

And the focus – I'm going to focus my proposal today on the general category, I do have a specific outline of the other categories, but because the majority of products are addressed in the general, I'm going to focus there today. So, for the small charger standards proposal, as I mentioned, multiple metrics, a 24-hour charge and maintenance energy should be less than or equal to this equation, and basically Eb is the battery capacity that's

measured of the individual chargers, so basically the efficiency that's required scales with the size of the battery; and 1.6 times is sort of the 160 percent of the energy battery is allowed for the charge cycle, and then 12 additional watt hours are given for the purposes of battery maintenance over the course of that 24-hour charge. Maintenance power should be less than .5 watts. No battery is less than .3. Power factor depends on the input current and basically we're looking for input currents of an amp or greater, and in those modes were the input current is an amp or greater, a power factor of .9 is required, so it's really only for large current applications. Here is the visual of active mode efficiency requirements, so when you take that equation and you make it into a line, and you graph it against the data, what you see on the X axis is the measured battery energy, so that's basically that Eb that you saw in the equation, it is in watt hours, and this is an logarithmic scale, so I just want to be clear about that, it's logarithmic on the horizontal axis only. The blue line is the proposed standard that PG&E is bringing forward, you can see a number of products from a variety of chemistries already past the standard that are in the marketplace. The technical limit is an approximation, it is not meant to be set in stone, but it's sort of what we think the technical limit that is possible. This is far below that technical

limit and below what might be entirely cost-effective. That is, the cost-effective – there are cost-effective savings beyond this proposed standard, but for the purposes of this proposal, we have put forward a savings or an average efficiency of about 40 percent on that 24-hour, not as high as 70 percent, which is closer to the technical limit. Here is the battery maintenance mode data that we have from our dataset at .5 watts. I want to say something about these green dots on the far right side. Those are lead acid chargers and you can see that none of the lead acid chargers in the very high elements meet the .5 watts. The .5 watt recommendation was developed in consultation with our electrical engineering staff that determined that using low power – current low power, power electronics technology – is feasible for these larger chargers and the battery self-discharge for lead acid batteries is not high enough over a 24-hour period to warrant a higher level until you get to about 10,000 watt hours of battery energy. And no battery mode level is essentially the same as a standby and we are looking at a .3 watt proposal.

I'd like to say something quickly about the emergency exit sign standard, this is a non-consumer battery charger standard. It's given a little bit more energy in the 24-hour requirement because of the need to light the LEDs that indicate the exit. In addition, maintenance power

is higher because, again, the lights have to be engaged on a continuous basis and cannot be shut off. I just want to say that, for this particular – well, let me move forward.

For the inductive charger standards proposal, this was developed with feedback from industry, and what we're proposing is that the inductive chargers may either meet the small standards proposal that I just walked through, or they can meet this alternative proposal, which is essentially one watt all the time. So, if you're charging one watt maintenance power less than or equal to watt, no battery power less than or equal to a watt, and this is what we hope will encourage the best of inductive technologies save some energy, but still allow for that safety requirement and corrosion requirement for these specific products.

So, in case you thought there were too many metrics for the consumer proposal, I thought I'd just throw some more at you for the large battery charger systems. And the charge return factor, it's important that the charge return factor, which is that measure of how well the battery is charged and how well the charger can respond to charge the product, is within a certain acceptable range. Too low, and the battery is compromised for a lifetime; too high, you waste energy and the battery is compromised for a lifetime, so we're looking for a charge return factor that's basically in tier one, between 105 and 115 percent, for Tier II,

between 105 and 110 percent. We have a little bit different expectation for 40 percent of discharge, and that's in part because it's more difficult to design a charger that adjusts its charge appropriately for lower depths of discharge, so only when the battery is partially discharged. And so, therefore, cost-effectively, it's not as appropriate to make that as stringent.

For power conversation efficiency, we're looking at somewhere, for Tier I, 84 percent; for Tier II, 89 percent, so that's moving from the average that we saw between 75 and 90, pushing that toward the high end of what we see in the marketplace today. We are looking at a power factor for these products is important because they consume large amounts of energy at high currents, and so we're looking for power factor correction with a value of .85 for Tier I and .95 for Tier II, and then we're tightening down on battery maintenance and no battery power somewhat in Tier I, but then more aggressively in Tier II in the 2013 timeframe.

Here are the data, this is also in the Case Report where you can study it a little more carefully, there is so much data it is difficult to show on screen, but we have four different topology types along the top, the dominant topologies today are ferroresonant and Silicon Controlled Rectifier, or SCR, high frequency and hybrid are alternative topologies that are designed for higher efficiency. So,

here is the data that is in the red, mean it doesn't pass that metric. Similarly, here is the same standard, here is the same data with Tier II requirements and, again, inside the colored is passing and outside is not passing the current standard.

I will take a few moments to address incremental costs. For small battery charger systems, we're looking at about 42 percent of the market as we estimate, currently complies with the small battery charger standard. So, nearly 100 million of the 170 in California needs some type of improvement, where the average savings is around 11 kilowatt hours per year, so, as I mentioned, many products in use, but not very much energy use per unit, so we see small savings numbers per unit. But the incremental cost associated with improving these products is fairly small. Advanced battery charger system controller ICs that help with the charge control issue are about $.5 a piece in OEM quantities. Some products might be required to have high efficiency and modes where the consumer doesn't use them as often, but when a charger is designed to be efficient, the additional cost of improving each mode is relatively small. And so we can get incremental costs of about $.30 on average per product to save $.78 per year, so depending on the lifetime assumption of the product, you have a return on that initial $.30 year over year, and in the first year, on

average.

For large battery chargers, the costs are much higher, but so are the savings per unit. So, in Tier I, the likely strategy to meet this standard would be modular add-ons for Smart control electronics that are in the range of $100 to $150. For Tier II, power conversion efficiency technologies are more expensive because we really have to get better power conversion in Tier II, about $100 to $400, depending on the power and the design. Because these chargers are used so heavily that incremental cost of these more efficient chargers is recovered, we estimate, within the first year of operation, and certainly within the lifetime of the charger, which tends to be about – we're estimating 15 years, but even if you say 10-15 years, still clearly cost-effective.

Power factor correction, as you notice, was part of the small battery charger system standards proposal, as well as the large. Power factor correction, the attention on power factor correction opportunities for energy savings was recently brought to our attention in a Public Interest Energy Research report that was created by EPRI and published by the Energy Commission, and it showed that there are measurable energy savings associated with reducing losses in building wiring, associated with poor power factor. And so, for the purposes of this proposal, we

determined that it is only cost-effective to look at power factor correction for large currents, greater than an amp, but it's not cost effective for very small currents. So that's why you saw the greater than an amp requirement on the power factor for small; because large chargers have significantly high currents, then it is appropriate to have a power factor requirement for all those products. And between seven and eight percent of usage attributable to losses in battery chargers is actually associated with poor power factor, so the poor power factor results in losses in the building wiring.

I want to provide some clarification about our recommendation on test protocol for this standard. Right now, the CEC has adopted – I should say, in 2008, they adopted – a test procedure for Part I, which addressed small chargers, Part II, which addressed large chargers. And the DOE is expected to adopt a consumer battery charger test procedure either later this year or early next year. What we would recommend is that the CEC test procedure be utilized for standards development in the interim, before the DOE Final Rule has been issued, and we expect, then, that the test procedures are going to be similar enough that we should be able to make progress forward on a standard, and then utilize the DOE consumer test procedure in place of Part I of the CEC test procedure once it's finalized and

later this year, or early next year. Part II of the California Energy Commission test procedure can be freestanding, it addresses industrial chargers, it's non-consumer applications, and so CEC should feel free to proceed and use that for the large standards proposal we have here.

Just a bit of summary on the savings. We found a lot of different numbers thrown around and I think, depending on how you count the energy savings, I think we saw 2,700 as a possible savings. The number that we prepared for the Case Report is around 2,400 gigawatt hours per year after stock turnover, which is basically, depending on the product category, 60-70 percent of current energy use can be saved with small chargers. That's because currently there are about, on average, 10 percent to 20 percent efficient, depending on how you do the average, and we are encouraging them to get closer to 40 percent efficient.

Large battery charger energy savings will be smaller as a percent, it is eight percent of current energy use, and the reason for that is those products are already quite efficient compared to the consumer, so there's not as much savings to be had, but we're looking at 300 gigawatt hours per year with Tier II. All battery charger energy savings is about 35 percent of current energy usage. This is almost the equivalent of building one power plant, which is this

Measure of Rosenfield, it is a measure that has recently been adopted in the Energy Efficiency community to talk uniformly about power plant savings, and so we're looking essentially at building one power plant, or close to one power plant with this standard, which is equivalent to almost 400,000 homes in California.

I didn't get too much into net present value today in part because of time, but that's documented in the Case Report, which I expect to be posted today, but it's $450 million in the first year and $2.4 billion after stock turnover. Those are energy savings to the customers and ratepayers of California. And all of the cost-effective savings opportunity is higher, so we feel like this is a standard that we are putting forward that is meant to be a compromise between pushing all the cost-effective savings, trying to get closer and closer to that technical limit. We feel like we're not – the approach for the standard is not to get all the way there, it's to make a first good step toward improving the energy efficiency by taking the average of 10-20 active mode efficiency up to around 40.

So, in summary, small chargers are high volume, high tech products that had efficient charging solutions that are inexpensive and widely available. We see them in the market today in places where portability drives the market; in places where price drives the market, those solutions have

not been implemented. PG&E research demonstrates the feasibility in improving consumer chargers to 70 percent, this standard does not go that far. As I said before, we are looking at improving efficiency to around 40 percent. And approximately two-thirds of the energy can be saved and we're looking at a multiple metric because the duty cycles are not well understood, or, if they were well understood, are probably very high standard deviation for duty cycles. And so, improving the energy use of each mode is important to ensuring energy savings. For large chargers, the metric is based on Part II of the CEC Test Procedure, it includes power conversion efficiency, which is a measure of how well you convert alternating current to direct current, charge return ratio, how well that battery is charged to ensure it's not under-charged or over-charged, regardless of the depth of discharge of the battery when it's placed in the cradle. Maintenance and no battery power in power factor, incremental improvements are about 10 percent energy savings. This is the specific number you'll see in the Case Report, it is eight percent, and improvements for about 4 megawatt hours per year. The added cost could be anywhere between $100 and $400, depending on the unit, but we can save $400 a year of energy per year for a 15-year life. So, the puzzles that we're putting forward are meant to be a reasonable compromise, that are clearly cost-effective, and

that can give the ratepayers of California an opportunity to eliminate the split incentive, which is ensuring that, if they pay a little bit more for a product up front, that it saves the energy over the course of that product's life.

These are some references, they include the Case Report, the Technical Primer that I talked about earlier, as well as the test procedure. The Case Report should be available on the CEC website, PG&E has submitted it to the docket. The other two reports are available online at efficientproducts.org. Thank you.

MR. LEAON: All right, thank you very much, Suzanne for that very in-depth presentation, which details the contents of the PG&E proposal. I understand we do have a hard copy of the Case Report on the table, near the entrance to the Hearing Room, and we will get that Case Report posted to the website today. So, again, thank you for that in-depth presentation. And I'd like to ask for any blue cards in the room at this moment. Okay. Can I ask staff to collect the blue cards? Thank you.

And I did want to emphasize that what we're working towards today is the November 18th Committee meeting. Staff is still reviewing the PG&E proposal and does not have a recommendation today regarding that proposal. But we are looking for your feedback in helping us to analyze the proposal that's been put forward. We are asking for your

comments, written comments, by October 29th, and that will help us to inform our analysis of the proposal. And we will be bringing forward a staff report at the November 18th Committee meeting, making a recommendation on Efficiency Standards for Battery Chargers, so we are working towards that as our next major milestone in the process, and certainly are looking forward to receiving your comments on the PG&E proposal.

Okay, I do have a few comments. And first up is Rick Habben, if you could come on up to the podium. Thank you.

MR. HABBEN: Hello. My name is Rick Habben from Wahl Clipper Corporation, we are a manufacturer of beard and mustache trimmers and shavers. I have several different questions and I guess comments I want to just propose out there, based on the presentation. I guess the first comment that I have is, I'm curious as to why the California Energy Commission is wanting to do a regulation on the consumer battery chargers when the Department of Energy is currently working on that, and the two regulations may be in conflict with one another, with potentially a date of maybe a year apart, where the DOE may be 2013, where you guys are proposing 2012. This would make it very difficult for us as manufacturers, you know, potentially having one particular product for consumer use that would be for the DOE proposed

regulations, and for the California Energy Commission. I don't know if you want to comment on each question as I go, or if you want me to do them all and then have her comment at the end.

MR. LEAON: Well, if you don't mind, why don't we respond to each one as we go along. Suzanne, did you want me to respond to that question? That was perhaps directed more to the Energy Commission.

MS. FOSTER PORTER: Yeah, that would be good. Please.

MR. LEAON: Okay. Well, regarding why California is proposing to adopt standards for battery chargers, we've invested quite a bit of time and effort in working with stakeholders to develop the test method for the battery chargers, and this is a continuation of that work. In addition, the DOE does look towards California to help inform its process, and by developing the standards at the State level, we'll be helping to inform that process and, in a sense, they don't have to reinvent the wheel when they go through their process to develop these standards. And, in addition, it's my understanding that the Energy savings that accrue to the State by adopting a California standard will benefit not only the utilities, but also the people of the State of California, and that those savings can be passed through to the public in the form of rebates. And if one of

our utility representatives wants to expand on that a little bit, I would appreciate that. Is there anybody that would like to speak on behalf of the utilities on that point? Okay. Well, I think that's the short answer. It will help inform the development of the Federal standards. This is a continuation of the battery charger standards, and California will benefit by realizing the energy savings from the California standard before the Federal standard preempts the State regulation.

MR. HABBEN: So the intent of the California Energy Commission would be to push DOE to adopt basically to their same regulations? Is that correct?

MR. LEAON: Not necessarily adopt the same regulations, as we can inform their process. I guess what I'm saying is we can't guarantee that they'll adopt the same standards, but, yes, we do want to inform their process and I think there is a benefit if they do adopt California State standards, to both the industry and the public.

MR. HABBEN: Okay, I just hope that it's noted from the Commission that, as you can see from a manufacturer, it does make it difficult if you're making a product and it has to comply with two different regulations.

MR. LEAON: Absolutely.

MR. HABBEN: The next thing that I just want to comment on is that there is data from at least us as a

manufacturer, and I believe other manufacturers, regarding the duty cycles for products. And the reason I want to bring this up is that I think that, without knowing the duty cycle of particular products, it greatly skews the amount of savings that you're estimating that you're going to save. And I'll give you a for example, we have data out there that, on duty cycles, on rechargeable beard and mustache trimmers that most of the time the product, the power supply, the battery charger is unplugged and put in the drawer and only pulled out when it needs a charging. And one of the main reasons for this is that most women do not like the clutter of the battery chargers on the counter and the cords laying around, so I guess when you're bringing the numbers up for the savings, you know, without knowing the duty cycles, I think there's potential error there for the amount of savings that you're actually saving there. That's more just a comment. The next thing –

MS. FOSTER PORTER: May I address that and just to clarify the way that we did the methodology for savings? This is Suzanne Porter from Ecos. Just to be clear, we agree that reasonable assumptions need to be made regarding the duty cycle of each individual product, and we ourselves have utilized whatever data is available, however limited, or made reasonable assumptions when data are not available in order to calculate the energy usage and the savings. We

feel like that's a necessary step in order to quantify savings, so I don't want to give the impression that we're not using any duty cycles to calculate the numbers. Our only argument is that, if you have to make assumptions, then those assumptions should not translate into the standard, that this standard which is the regulating principle of how to improve the efficiency of the charger should address each mode individually so that we can ensure that there are energy savings. Thank you.

MR. HABBEN: So moving on to the next issue that I have to comment on, is regarding the battery maintenance mode. You're proposing to set it at .5 watts. I guess, for us in our company, this would be a definite hurdle for us to overcome due to trying to keep the cost of the appliances down where the consumer, it is affordable for them to purchase. And I also understand that you have, you know, had some approximate costs out there for components to accomplish this. A couple different things – one is, what were the type of quantities that those prices were? My guess is that they would be fairly large to get that cheap of a price. And then, the other thing that I wondered if the case study had taken into consideration is that, if there are products already out on the market that didn't allow for these type of electronics or cut-offs to be in them when they were designed, we have products right now

where we've tried to keep the products as small as possible for the consumer, so now to try and put this type of electronics in here to cut it off, we're basically looking at new molds, new designs for our products to accommodate these additional components. There's just not room in those products to fit these additional charge control circuitry, so it's not a matter of adding a five cent component, it's a matter of replacing between a $30,000 and a $60,000 mold for a product that has to be redesigned. So, you know, that's something that needs to be considered when you guys are going to implement this, it's not just a matter of us adding an inexpensive charge circuit. When you also calculated the energy savings that was going to be obtained for your case study, were the products that were tested and measured, were they products that were within the last year? Or were they products that were greater than two, three, four years old?

MS. FOSTER PORTER: Our dataset varies in age, so we first started testing products that are being used for this Case Report as long ago as 2006, end of 2006, we tested products in 2007 and 2008, but for the purposes of this study, we actually were wondering if the market had changed, so we tested 25 products for Pacific Gas & Electric earlier this year, and the ranges of efficiency that we found compared to the original dataset were fairly similar. So, although some data are as many as three or four years old,

we did recently do a comparison study to see how it might have changed over time and uncovered that it really hadn't.

MR. HABBEN: I think at this point in time, that's all I have.

MR. BECK: Mr. Habben, my name is Dennis Beck, I am a senior staff counsel with the California Energy Commission. Thank you for coming and giving us this information, but I do want to emphasize to yourself and those others in the regulated community that, while your comments are well taken, what we would really like to have, and you mentioned this in your first question, is the –

MR. HABBEN: Usage?

MR. BECK: -- data that you had regarding the duty cycles, I believe. This is something that, in order for the Energy Commission to property consider what is being told to us by stakeholders, whether those are manufacturers or others, we need more than just conclusions, but the data that supports them. And when we get that data, we can compare that to the data that we've received in the case study or elsewhere, and it is only in that kind of a process when we have the data to look at and compare that we can really make a rigorous comparison and analysis. So, again, of those people who are either going to be making comments today, and hopefully you will file some comments to the record that will contain some of this data, that's what

we're really looking for and that's one of the primary reasons that we're having this staff workshop, is to get the regulated community to start thinking about these battery charger standards and looking at any data they may have that would inform that process, and make sure that the standard that we do eventually adopt is based on the most current relevant data that we can get.

MR. HABBEN: And that's what we would like, as well.

MR. BECK: Thanks.

MR. LEAON: Thank you, Dennis. Okay, next blue card is from Larry Albert.

MR. ALBERT: Thank you. Larry Albert from Stanley/Black & Decker, representing the Power Tool Institute. A series of questions here and, again, please excuse if they seem a little disjointed here. I didn't have, again, the benefit of reviewing the materials prior to the meeting. Just to clarify a comment that was made earlier from staff, that this a PG&E proposal and not a CEC proposal?

MR. LEAON: That's correct. What's being presented today is the PG&E proposal, this is not a staff proposal. The staff proposal will be the subject of the November 18th Committee Workshop.

MR. ALBERT: All right, thank you. Secondly, to follow-up with Rick's comment and also the comment of staff

counsel there, I believe that Ecos did engage in a study of plug loads in the State of California that was intended in part to determine duty cycles of various plug loads. Did it include battery chargers, do you know?

MS. FOSTER PORTER: Yeah, there were two studies that were conducted for the Public Interest Energy Research Program that Ecos performed, the first was in the residential sector, and the second was in the commercial sector. The focus of those studies was on the larger plug loads, so things like TVs, computers, and other office equipment, where data at that time were not very widely available on those duty cycles, and so that was the focus of the study. Some battery chargers were measured as a lower priority element to the study, but those data were used for our estimates. But they're very limited; for example, there may only be one or two data points on a particular battery charger. So, although it's useful for suggesting a duty cycle, we also saw a real wide variation, generally speaking, and so we wouldn't recommend it as a standards approach because we only got a few data points, and the data points we did get varied widely.

MR. ALBERT: But you did use that data as the basis for your – for the estimates that you had with respect to consumer savings of energy usage, is that correct?

MS. FOSTER PORTER: Yeah, you necessarily have to

make some assumptions about duty cycle for the energy usage and savings, and those were informed by the study because no other data were available. But, for the purposes of the regulation, we would recommend not using those values.

MR. ALBERT: So do you have concerns about the validity of your estimates?

MS. FOSTER PORTER: The estimates are based on the best data available.

MR. ALBERT: You used several times the term “24-hour efficiency.” Could you explain that?

MS. FOSTER PORTER: Sure. I’d be happy to. Let me use a slide to illustrate it. I’m not sure how to get the slide cued where I can choose a slide, but here’s the one. So, the 24-hour efficiency test is specified in the California Energy Commission test procedure, Part I, and in that approach, the battery charger is plugged into the wall, or plugged into the metering equipment, rather, the fully discharged battery is placed on the charger, it has an opportunity to charge the product, and then maintain the product for a period of 24 hours, and although I used that in the presentation for batteries that take longer than that to charge, the test procedure allows for longer periods, and so the total energy that’s measured on the input side is recorded, and then that is compared to the total of direct current energy that is pulled out of the battery after that

sequence of charge. So what you get as an efficiency metric is the total energy that you take out of the battery tank, so to speak, divided by the total energy that goes into that battery tank over the course of the 24 hours, or sometimes longer, as required by the product.

MR. ALBERT: And while you use this metric in your presentation quite a lot, you're not recommending that as a metric for regulation?

MS. FOSTER PORTER: It is a metric, well, the actual language that we recommend in the Case Report does specific an efficiency level that is drawn by the curve, so let me find – bear with me a moment, please – so the line here is on a 24-hour efficiency scale, and you can look at the metric in a couple different ways. You can say that the 24-hour efficiency has to be less than a certain value specified by the equation; alternatively, you can turn that mathematically into an efficiency criteria where the numerator is the energy of the battery as it's discharged over the course of the test, and the denominator is that equation for each individual, which is I think 12 + 1.6 energy in the battery, so this line represents that efficiency metric if you graph it visually as a function of battery energy. So, we are proposing to use it as one part of the metric.

MR. ALBERT: All right, thank you. The next

question is, you had a scatter plot, I think it was similar to that one, except it was for maintenance power?

MS. FOSTER PORTER: Uh huh.

MR. ALBERT: All right, and so interestingly, while the 24-hour efficiency is scalable based on Eb, you're not recommending having the PM limit value scalable on the basis of Eb, even though it certainly would seem, on the base of the scatter plot to be trending in the direction of increasing PM values based upon Eb value.

MS. FOSTER PORTER: That's right. The trend in the marketplace is to have higher maintenance power for higher battery energy, but that is a result of losses that occur either in the power supply or the charge control circuitry that can be dramatically reduced. And so, for the purpose of this portion of the metric, we focused on technology that could reduce the losses associated with the power supply and the power conversion efficiency, and what we uncovered is that, until you get to about 10,000 watt hours of battery maintenance energy, you really can fairly easily meet the standard of .5 watts.

MR. ALBERT: And I can only see it slightly better now than before, but I'm looking at the NiCd data points there. Are there any NiCd data points that are below the limit line?

MS. FOSTER PORTER: This graph doesn't show any and

that's principally because NiCd chargers tolerate a very high – or, I should say they easily tolerate overcharging, so, as you probably know, you can triple charge a NiCd battery unit and it doesn't present any safety concerns, and so a lot of these higher maintenance powers associated with NiCd are based on products that have low price points, where they've principally been designed for price, and so they haven't really shut off the triple charge quite as much as you would see for like lithium ion where there are safety concerns. So, although there are no current products that we have, at least now shown on this visual with NiCd, we feel, based on our analysis, the NiCd chargers could be redesigned to have a lower battery maintenance limit that more appropriately addresses actual energy lost through self-discharge.

MR. ALBERT: And I am sure you are aware that NiCd sales, in particular, have a requirement for maintenance current that needs to be provided for them to be able to retain their charge. What makes you believe that there are NiCd chargers, particularly at a higher level of Eb that would fall within the California proposed standard limit?

MS. FOSTER PORTER: The self-discharge requirement can be addressed, and I didn't get into the technical details here, but the limit that is proposed is not an absolute limit, it is an average limit, so what that means

is that, as long as the average over the battery maintenance cycle is less than .5 watts, the charger has latitude to jump up to counter self-discharge, and then come back down, it is really an accumulated energy average that we're looking at for the .5 watts. So, based on the technology available and the analysis we did on charge control, .5 watts is achievable with components that are readily available on the market.

MR. ALBERT: And you've encountered one of these chargers commercially available in the marketplace?

MS. FOSTER PORTER: No, the chargers that were available in the marketplace were not necessarily NiCd, but they were associated with chargers like nickel metal hydride that have even higher self-discharge rates than the NiCd, and you can see some of those are below the line.

MR. ALBERT: You mentioned earlier that there was a battery control integrated circuit available for five cents. Do you recall what functionality it performed?

MS. FOSTER PORTER: Yeah, my recollection of that is it had the purpose of monitoring the battery, and then when the battery was fully charged, it could shut down the charger to a lower level.

MR. ALBERT: These are NiCd cells that you are speaking of?

MS. FOSTER PORTER: They could be used with NiCd or

nickel metal hydride.

MR. ALBERT: So it is interchangeable?

MS. FOSTER PORTER: The IC itself – you are testing the limits of my specific knowledge I can pull out of my brain because I don't have it in front of me, but I don't believe they're interchangeable, but I do think – my recollection is that there were designs available, and we can maybe address that in a more detailed comment later.

MR. ALBERT: Okay, that would be good. You spoke specifically about power factor correction, the value it had on energy savings, not in the product necessarily, but in residential wiring and commercial wiring, and it was only applicable for chargers that would be over one amp input current, RMS. Is that correct?

MS. FOSTER PORTER: The standard was only for greater than one amp input current, although savings can be achieved with lower input currents, they're just not cost-effective, immediately obviously cost-effective.

MR. ALBERT: So were you able to determine whether a regulation limiting power factor to .9 and above for one amp in larger chargers was cost-effective? That is, the energy savings realizable by the consumer, right, was offset by the cost of employing a power factor correction circuitry?

MS. FOSTER PORTER: Yes.

MR. ALBERT: Okay, and that is in the Case Report?

MS. FOSTER PORTER: Yes. The methodology used for calculating savings, as well as description of the costs are in the Case Report.

MR. ALBERT: Okay, thank you. All right, thank you so much for fielding my questions.

MS. FOSTER PORTER: Thank you.

MR. LEAON: Thank you, Mr. Albert. We do have a couple more blue cards. In fact, can I ask that we keep the questions brief at this point, for the folks on the phone, I am going to ask that we'll come back to you during the open discussion part of the workshop at the end of the day. I think we need to break for lunch within the next 10-15 minutes, at most. You're ready for lunch now? Okay, well, I do have two blue cards. Let me ask, I have one from Rick Erdheim and one from Wayne Morris, so are you comfortable holding your questions? Okay, let's go ahead and break for lunch and meet back here at 1:30. There is a cafeteria on the second floor here, there is also La Bou on the corner of – let's see, it would be 11th and O, if you go out the front door of the Commission, turn left, and go straight down O Street two blocks, there is a La Bou there. If you go out the front door to the right, and left one block down P Street, there's a couple of restaurants kitty corner on 10th and P.

(Off the record at 12:45 p.m.)

(Back on the record at 1:37 p.m.)

MR. LEAON: This is Mike Leaon. We're about to reconvene the workshop. If you could all get settled in, I would like to propose that – we did have a couple blue cards after our last presentation and I wanted to ask if it would be okay if we held those until the open discussion part of the workshop. All right, thank you. So, we'll hold those questions until the open discussion phase and I'd like to go ahead and introduce our next speaker, Pierre Delforge, with the Natural Resources Defense Council (NRDC). And Pierre will be presenting some information on appliance labeling.

MR. DELFORGE: All right, thank you. My name is Pierre Delforge with the NRDC and I would like to thank the Commission for the opportunity to make this short presentation. So, why a proposal on efficiency labeling? As you know, we were involved back in 2005, even before, in creating the external power supply marking protocol, which as we will see in a minute, was instrumental in helping transform the market for external power supply efficiency. And we recognized that, in this battery charger effort there is probably a similar opportunity, and we wanted to highlight and propose that we take a similar approach. Oops, for those on the phone, we have a presentation problem here.

So, the concept is to create a marking protocol or a

marking scheme with, you know, Roman numerals, it could be something else, but just for the illustration, just like the external power supply, a marking protocol. And the rationale for this would be to create an okay, better, best scheme that would make it easy to identify the level of efficiency of a product. We all know that efficiency is intangible and difficult to measure, especially for different types of products, so that would give a simple way to recognize and to manage the different levels of efficiency. Interested jurisdictions could require different levels, depending on how stringent they want to be, or they could just require labeling without requiring a elementary level. And it also provides flexibility to add and to evolve over time as technology evolves and to require more stringent levels.

The specific issues that we have to address with electric chargers, first, as we saw this morning, and the speakers mentioned this morning, we have a large number of different types of small chargers, which makes it challenging to collect data for each of the different types. I think we have dozens, potentially even hundreds, of different combinations and form factors, duty cycles, battery capacity, and this makes it very challenging to have the right level – you know, the exact data that would allow us to have the tight standards. So the label would help to

have a simple scheme to recognize efficiency levels across all these different types.

The other issue that we are facing is that we have a number of jurisdictions, especially in the U.S., but also around the world, which are currently looking at different types of metrics, or a battery charge efficiency. I mean, DOE, I think, seems to be looking at an annual energy use metric, was, I think, the proposal that we saw this morning about efficiency per mode metric, and I think we have an opportunity with the labeling scheme to help harmonize these metrics before we adopt different ones. I think the risk of having diverging standards would be to increase the cost for manufacturers, the cost of compliance. It would also increase the cost of regulation for all regulators around the world, and therefore slow adoptions. So, I think it would be a lose-lose to have diverging metrics. So, I think, you know, having a single marking scheme with a common metric would be both faster to adopt and cheaper. And the last point, which is not challenged by an opportunity would be for California to really lead the adoption of an international marking protocol similar to the one that California did in 2005 with external power supplies.

A quick reminder of the additional power supply marking protocol, it was created in California – well, by

California in collaboration with Australia and China in 2005. It since then has had broad adoption, both in the USDOE and EPA, but also internationally with Canada, EU, New Zealand, I am sure other countries which I don't recall. It's very simple to use for both utilities, regulators, manufacturers, and it's been very effective at transforming the market. Now, we have standards, manufacturing standards for Level 4 which, you know, we started in 1, so it has gone quite a way since then, and we have common level 5 EPAs on the market today.

So the scope of the proposed marking protocol is both small and large, but we believe that the priority should be on the small because of the issue of having all these different types of products. We've leveraged the definition that is proposed in the Case Report of 3,000 watt hours for the distinction between the two, something which can be worked on, suggest a Straw Man, but we believe this is, you know, if we can focus on the small chargers as high priority. Ideally, we would like to have large chargers covered, as well, if we can do both. We think that would be the best outcome, but given the challenge that we are facing with the small chargers in terms of numbers of different types on the market, we believe this is the highest priority.

In terms of the mark itself and the efficiency

levels, so we've proposed to leverage the Roman numeral scheme for EPAs and just prefix it with BC for Battery Charger, and then this is really a Straw Man where, you know, we want to put it out there for discussion, it could be anything else as long as it's compact and differentiated from the external power supply mark, but follows a similar concept. The levels – we propose to start at 1, and 1 not having any specific criteria, just being less than 2, and the reason for that is to allow jurisdictions that, you know, beyond California. So, here we're trying to think California, but also beyond, that we can try and have this protocol become a national and actually international standard. So, what we're thinking is, if we can't have a level 1, less than a certain level of efficiency, then we will allow other jurisdictions to adopt, to make monetary laboring without necessarily having a name or requirement.

Level 2 would be modeled after the California standard and, you know, I've just put these out there as an illustration, it's not necessarily what the level 2 needs to be, but we just wanted to allow it with whatever standard is adopted in California. Then, we have Level 3 which could be potentially the Energy Star or utility standards or anything that is higher than – so not anything that is higher, but some level of criteria which is higher than Level 2, and then we can carry on using 4 and 5 options we'll use.

I just illustrated for the general small charger standards, I mean, we would have to use similar -- different similar criteria for the other classes of small chargers, you know, the inductive and Emergency exit signs, and as well for – if we extend it to the large, to have specific criteria for the large class, but the concept would be similar.

We have a number of open questions that still need to be defined. I was talking about the exact criteria for each product class to be defined, location of the mark, we have a little bit of a challenge there in terms of not having existing labels on battery chargers, contrary to external power supplies, so we would have to figure out, you know, depending on the form factors, where could that go and whether it is practical, and ultimately to finalize the mark. But I think all of these are issues that can be figured out easily if we get an agreement on the concept and principle and we work together to the final details.

So I just want to summarize before we open it up for Q&A, you know, we believe this efficiency marking protocol would help facilitate the transformation of the battery charger market in a similar way as it did for the EPS market. We think we have a short window of opportunity to get going, to help converse with the U.S. protocols, and that will make it easier and cheaper for both industry and

regulators to adopt the high levels of efficiency. And I think it is also a very flexible scheme that would help, you know, make it simpler and drive adoption faster. So that's all I wanted to mention, and thank you for your attention and if we can open it up to questions?

MR. LEAON: All right, thank you very much for that presentation. Any blue cards in the room?

MR. ERDHEIM: Good afternoon. I'm Rick Erdheim with Philips Electronics. The Department of Energy has proposed, or at least has broken down battery chargers into 10 different categories, inductive and then 9, which I think would be in the general category. So, would this system work if we had 10 different categories, let's say, the one you're proposing? Would that confuse consumers when they look and they would see – they wouldn't know which product went into which category?

MR. DELFORGE: In theory it would work, it means that we will have to define criteria for each of these different classes. Ideally, we would like to align, to design the scheme so that it is simple and a fairly low number of categories, and that's why we are trying to adapt it to the California standard, would be ideal.

MR. ERDHEIM: But suppose the decision was made, the CEC has not made even a proposal, suppose the CEC said, "We need 10 different categories?"

MR. DELFORGE: So I think technically it could work. The issue with the consumer recognition – this is not a consumer – facing – it is not intended, it is not targeted to consumers. I don't know anybody today who checks the efficiency levels on their external power supplies. I think it's really – what, Ken? So, I think it's really intended for manufacturers to make it easy for them to request a certain efficiency level to their component suppliers and for regulators and industry to have the dialogue. I don't think it's a consumer space. So, in that sense, I think it would work within the high number.

MR. ERDHEIM: Okay, could you go back a slide or two, another one? Yeah, that's the slide with the proposal?

MR. DELFORGE: Yes.

MR. ERDHEIM: So how did you have access to the proposal, which was just put on the CEC site this morning?

MR. DELFORGE: Well, we've been involved in some interactive discussions with PG&E. Again, this is illustrative, it is not meant to be a standard. I did not know until this morning whether it was the actual final proposal, but you know, this is just an illustration of saying what the California position of standards is going to be –

MR. ERDHEIM: So you've been involved in developing the proposal?

MR. DELFORGE: We've been involved in informing discussion with PG&E.

MR. ERDHEIM: Okay, I just want to know who has been involved because I know we haven't been involved, so I just want to clarify who has been involved in this. Thanks.

MR. LEAON: Okay, do we have any additional blue cards in the room? Yes.

MR. HABBEN: I guess, uh, this is Rick from Wahl Clipper – one thing that, I guess, if we're going to have a separate and new mark, one of the things that I think we need to consider is that, if we have a battery charger which currently has an energy efficiency EPS that's currently being marked, it would be nice to have a mark that was another one that you could use in combination with the battery charger, so that you would know that it also met the EPS efficiency level, along with the battery charger. And I don't know how many battery chargers and EPS's that you've looked at, but the smaller ones, there's not a lot of room on the nameplates, and there's already a lot of approval symbols on those, with the model numbers, with the output and input ratings, so continuing to add more and complicated marks, the real estate on those labels becomes ever increasingly small. So, if there is going to be a separate one, that'll need to be considered when you're looking at this. And the other thing is, you know, I guess in the back

of my mind, if what you were saying earlier about the consumers not really looking at the nameplate, then what's the real purpose of having the mark on there to begin with if the consumers aren't using the mark? I potentially disagree with you in regards to the consumers using the mark, but I guess I'd like to get your comment regarding the purpose of the mark if the consumers aren't using it.

MR. DELFORGE: So, to your first question, I think the mark is intended to go on the battery charger casing itself, not on the external power supply. I know in some cases it is different, we have to work out, you know, with what Suzanne presented this morning in terms of the different form factors, we'd have to work out exactly where that would go. I don't have that, so I think it's one of the things to work out, so that's a good question. On the second one, so I don't have data on how many consumers are actually aware of the mark and its meaning. I think it could be interesting to look at it. I think the way, if we look at why the EPS mark has been successful, we believe it is because it has made it simpler for both industry and regulators to have efficiency bands, rather than have numbers which would be specific for each type. So I think it's making it much simpler to manage. We believe that is what is making the EPS successful and we believe we have the same opportunity in this case.

MR. HABBEN: Okay. The other thing, if the PG&E proposal is adopted close to what was proposed currently for small battery charges, there was only going to be one level, but I see you've already proposed four up here. So, if the proposal was to go through, what mark would you guys be proposing, that it would be marked at the BC2?

MR. DELFORGE: That's correct. So BC2 would be the level adopted by CEC for California. BC1 would be anything that is less efficient than that, so that if somebody wants to – if a jurisdiction wants to require labeling without requiring a minimum level, then it would be BC1 or BC2, depending on the level of efficiency, and BC3 – this is just to show – right now, it's not defined, it's just to show – and to be leveraged by other programs for future and high levels of efficiency.

MR. HABBEN: Okay. One other thing that I'd like for people to consider is that maybe you can do it with the mom and pop shops, but for mass retailers that have stores in all 50 states, you know, if something like this is implemented, it's almost impossible to control your inventories so that the product that gets shipped to California is different than the product that gets shipped to Illinois. So I don't really see the need for the other mark because, if you've got to comply with one state, with the mass retailers effectively, you have to comply with them

all because the mass retailers aren't going to keep different skews for different states. So, unfortunately, or fortunately, however you want to look at it, you know, if one state implements a particular requirement, more than likely, you're going to be making it for most all the rest of them.

MR. LEAON: All right, thank you. Do we have any other blue cards? Any questions from the phone on this topic?

MR. RIDER: The line is open.

MR. LEAON: Any questions from anyone on the phone? Okay, thank you, Mr. Delforge and we'll proceed to our next presentation. Randall Higa with Southern California Edison.

MR. HIGA: Hi, good afternoon. Thank you all for hanging in there for the last presentation of the day. I appreciate the time to make the presentation today. Mine is going to be a little bit different in that it's not so much a proposal, it's just sort of a status update of what's going on with on-road battery chargers. My name is Randall Higa, I manage the Codes and Standards Program for Southern California Edison, and I am not the expert from Southern California Edison to talk on this subject matter, so I've been supplied the information and, if you guys have questions that I can't answer, which I probably won't be able to, we will certainly get them to the right people and

get back to you. So I'll get started here.

Southern California Edison has a electric vehicle group that has been around for several years and they've been doing a lot of research centered around efficiency on both on-road and off-road vehicles. So, as Suzanne mentioned previously, we're involved with some off-road battery chargers, but we've also been working with on-road, and so I just want to give you some status update of what's been going on in the world of on-road battery chargers. And frankly, as a result of that previous battery charger rulemaking that the CEC was doing, that we're involved with, the main automobile manufacturer -– automobile battery charger and battery industry -- realized that there was an interest in regulating and coming up with standards and whatnot for on-road battery chargers. So, as a result of what the CEC did, the automobile industry got together and said, you know, maybe we ought to take a look at this, ourselves. So the Society of Automotive Engineers decided to come up or to start looking at power quality, which includes efficiency. So, as you can see, there's two parts to it, the first part one is the efficiency and power quality regulations, and part two are the testing. And you may ask, why is it backwards? Normally, there are test standards, test protocols, whatnot, and then you set the efficiency standards, and I can't exactly answer all of

that, other than to say that some of the testing is still in progress and there are some very complicated aspects to it that I'll get to in a little bit. So, let me start to tell you how we're going to start to sort of begin this process. So, first I wanted to just show you that EV standards have been around for almost 100 years, at least, as witnessed by this connector standard; it didn't have anything to do with energy efficiency, but I thought it was a cool graphic, so I had to show it to you.

So, a little bit of background since 1913. In 2009, SAE wanted to look at both power quality and energy efficiency, so that was what they wanted to do from the outset. They put together a taskforce led by – again, this is an industry organization, so a General Motors representative, as well as one of our engineers from Southern California Edison's EV Test Center, so the two of them are co-chairing this, and are trying to get this done as quickly as possible. And a further slide will give you sort of a timeline of what they're looking at. So, SAE is an ANC [ph.] organization, so their process for passing standards and codes follows that. And, again, what they're trying to do is develop standards which can be adopted by the CEC, or whomever. So, that's sort of the intent of what they're doing.

The scope of this will cover onboard, as well as

off-board chargers for all types of batteries, so the scope is pretty wide. They're looking at anything on-road in terms of technologies and configurations, and everything else. And here is what they're proposing right now for the efficiency standards. As Suzanne said before, I think the highest power factor was 90 percent, again, as you get larger, you can have a higher power factor, so up it's at 95. Let me say that the EPRI column there is sort of the – I don't want to say "standard," it's sort of the legacy EPRI -- sort of requirements that they've been looking at for a number of years, so some of them are being matched, and most of them we're trying to improve upon. So, you know, the big one here is power transfer efficiency.

Now, you're asking yourself, why are we only looking at power transfer efficiency? Basically, what we're looking at is just on-peak – or, not on-peak – during the charge cycle of what the efficiency of the charger is, we're not looking at the energy in vs. energy output, nor are we looking at return charge ratios or any of that yet. And the reason for that is that, with a battery charger, it's not like a conventional battery charger, when you plug your EV in, you've got fans that kick on to cool the batteries, you also have a lot of accessories that may be enabled during the charge cycle. One of the features is that you can set the air-conditioner to turn on, or keep the car at a certain

temperature so that when you come back to the car on a hot day, the car will be cool, and because an EV doesn't rely on an engine to operate the air-conditioner, it is all electric-driven, you know, this stuff is not too difficult to do. And as a convenience item, it makes a lot of sense to do that. And, I don't know if you've ever been around a Tesla charging, but it sounds like a hurricane. You've got the fans going on the front end of the car, and the back of the car, and I'm assuming one is a condenser fan and the other one is cooling the batteries, but they're cycling on and off continuously. And so the SAE is trying to figure out how to separate the power that's going to these auxiliaries vs. charging the battery, and trying to come up with an appropriate metric. I mean, you know, if it's using energy, we want to make sure that it's doing so efficiency, but at the same time, you want to know how much of it is being used to actually charge the battery in which you're getting back out of the battery. So that's an issue.

Another thing I'll just mention is that most of the off-road battery chargers, the large ones for forklifts and the transportation things that go around the Airport, are lead acid batteries, and the charges there are generally pretty crude. If you remember from Suzanne's chart on the different chemistries, you know, lead acids have a high tolerance for overcharging, whereas the more advanced

batteries which are the EVs, the mostly lithium ion, have a very low tolerance for over-charging. So the chargers, just for the sake of battery longevity, are pretty good in terms of the controls that cut off the current once the battery is charged. It's a normal charger for EV for those types of batteries, so are going to have a fair amount of technology in them already that will make them energy efficient, so….

So, here is the status. Part 1 is currently in ballot with the membership and they're expecting a public release by November of this year. Part 2 is expected to be in the early part of next year, and will be complete by the end of next year. So it may be that we can start to do a couple of things, one is to look at adopting it into Title 20, and secondly, also getting involved with some of the – you know, after we get past the instantaneous sort of efficiency, looking at more of a 24-hour, or more of an in and out return ratio efficiency. So, those are sort of possibilities for things coming up. And that's all I have. And there's a *Nissan Leaf* in case anybody –

MR. LEAON: All right, thank you. Do we have any blue cards in the room? All right, one in the back here. Okay, Mr. Delforge, if you want to come up and make your comments?

MR. DELFORGE: Thank you, Mr. Higa, for your presentation. I have a couple of questions, the first one

probably for the CEC. I would like to know why the battery chargers for EVs are not in scope for the battery charger regulations which are being considered.

MR. LEAON: Let me have the staff come up to the table.

MR. RIDER: To my knowledge, and, again, this is an EV proposal, is the test method is yet to be developed. I suppose, as Randall Higa, as he was just explaining, the test method is not developed for these EV vehicles that have all these extraneous things that are going on other than charging the battery, for the fans and all these other things. So it's my understanding that it's primarily a test method issue and, secondarily, I would have to – Dennis Beck left, unfortunately – oh, no, he's right there – I don't know if there's a jurisdiction issue, as well, whether we can cover that or not – oh, he's unsure. So, therefore, I'm not sure.

MR. DELFORGE: All right, thank you for your answer. I would just like to make the comment that our projections show that there will be anywhere between 100,000 to 300,000 electric vehicles on the road by 2015 in California, which is a very significant number, and that if we miss the boat, if you want the window of opportunity including these type of battery chargers in the current proceeding, then we may miss a major source of efficiency opportunities. My second

question for Mr. Higa is, do you have any data on the current level of efficiency of chargers today? I know we only have a few vehicles on the road, but do you have that data on the efficiency?

MR. HIGA: What I was told was that the EPRI – and, again, we're just talking about sort of the instantaneous charger efficiency – that 85 percent has generally been a de facto standard that manufacture has been using, so I can't say everybody is meeting that level, but at least that's what people sort of – what I understand what they generally designed for. And we could find out more if we had that information. And again, these are mostly in the realm of the lithium ion and probably nickel metal hydride chargers.

MR. DELFORGE: All right, thank you.

MR. LEAON: Any other questions in the room? Ken, if you could open up the phone lines, we'll see if we have any questions on the phone on this topic.

MR. RIDER: All right, the phone lines are open.

MR. LEAON: All right, do we have any questions on the phone? Okay, all right, thank you, Mr. Higa, for your presentation. That concludes the formal presentation phase of the workshop. We do have time for open discussion now and I'd like to pick up with a couple of blue cards from the earlier presentation on the Case Report, and first up is Rick Erdheim.

MR. ERDHEIM: Thanks, Mike, and good afternoon. A procedural question, so I have a couple comments from the blue cards this morning and then some additional comments I wanted to make in the open period. Should I hold those off at this point, and just do the comments from this morning?

MR. LEAON: I think we can cover both.

MR. ERDHEIM: All right, thanks. So, I want to share the concerns raised by Rick Habben and Larry Albert this morning about the duty cycles. Quite frankly, I was confused in the discussion during the session and then afterward as to whether there was actually any data that was used by Ecos in the duty cycles. I would suggest that common sense, alone, would provide a great deal of data. Rick Habben used the example of a shaver, I'm sorry, of a beard trimmer, that's something, a product I happen to have a lot of experience with. I use my beard trimmer once a week, I charge it, it lasts 13-14 trims, which means I charge it once every three or four months, something like that. It charges in four hours. If you do the multiplication, it comes out to maybe 12 hours a year. But let's say I forget the charger and let it go longer, so it's maybe a day. So, the argument that we would include 365 days of charge for a beard trimmer wildly over-estimates the savings that would be available. And I would suggest to you that there are lots of products like that, portable DVDs

which we make, camcorders which we don't make, there's a whole list of products. But I heard the statement, "Well, we need data," so I would suggest that you look to the Department of Energy Technical Report and the appendices therein, which have usage data for virtually every product that uses a battery charger, so the data does exist, or at least the Department of Energy has made an estimate of the data, and the statement that, "Well, we don't have the data, or there isn't any data, therefore we didn't include the data," is really not warranted. Now, I want to follow-up on that because, in getting that data, the Department of Energy worked with manufacturers; I know that we entered into an agreement with the Department where we allowed our technical experts to talk to Department contractors to get data that was used in the technical report. And I have to just confess to being somewhat surprised, and I guess I would say even shocked, to hear that this report has been in the works for five years, that people outside of Ecos and the PG&E have seen the report, and yet the people who would be affected by the report, the manufacturers, only saw the report this morning when it was put on the website. And now we're being told, "Well, you guys, you have three weeks to comment." Now, I'll use the words "fundamentally unfair," and I'm sure Dennis will get very upset because that has legal meaning, but it is fundamentally unfair that you have

something that you're working on, where there has been no attempt to work with manufacturers, and then we're told, "Well, take three weeks to comment on it." So, now I have two questions for Suzanne. So, on the slide, I realize you don't have the slides up, but on the slide that had the inductive charge – and I appreciate the fact that you did recognize that inductive charge products were different – but on that slide, you said you had gotten feedback from industry, so I'm wondering, when you say feedback, does that mean industry supported the proposed limits? Or did you show industry the proposed limits? Or –

MS. FOSTER PORTER: So, what I'm referencing is conversations that my colleague, Dr. Paul Bendt, had with Philips, and I don't know if that was you, in particular, or someone else, regarding what was feasible for inductive charging, and so the proposal was developed based on that input. In addition, it's based on data that we have in our dataset where we have measured an inductive charger used with a toothbrush that uses .8 watts continuously, so the 1 watt proposal seemed reasonable based on the conversation Dr. Bendt had, as well as the data site.

MR. ERDHEIM: I'm wondering, do you have any written comments? Or this was just an oral conversation?

MS. FOSTER PORTER: We have documentation of the conversation, I don't have that in front of me right now.

MR. ERDHEIM: Okay, that's fine. But Philips, knowing Philips actually said, "Oh, this is fine?"

MS. FOSTER PORTER: No. The conversation was based on a concern that Philips brought to us when they knew we were looking at inductive charger standards, and so we talked with them about what was feasible, and we didn't give them the proposal at that time, the proposal was developed later, but I wanted to acknowledge that we did have the conversation with industry for this special case product class.

MR. ERDHEIM: All right, and I appreciate that you did that, I'm just not aware of the conversation and I'm not sure that it's consistent with what I'm being told, so that's the reason for my asking questions. On another slide, you said that 42 percent of the products would comply with the standards, but when you look at the Case Report, zero percent of personal appliances would comply. So, I'm wondering if what you did – let me rephrase that – in saying 42 percent complied, when I looked at it, it looked like there were more higher end electronics that were the ones that were complying.

MS. FOSTER PORTER: That's correct.

MR. ERDHEIM: So, now you've developed the standard based on higher end electronics which are physically bigger, which have more functionality, and probably higher priced,

and apply that to products that have less functionality, are smaller, physically smaller, and have lower prices. Is that correct?

MS. FOSTER PORTER: Let me modify that statement. I think you're partially correct. So, the product categories where we see very high compliance rates were those where the market drivers are principally portability and, for large chargers, efficiency. And so, the technologies that are employed do come at an extra cost, and what we're suggesting with the standards is that those same technologies which the market has adopted for portability reasons could be adopted by other products in the market that may be bigger or smaller than those battery capacities, and the savings is greater than incremental cost associated with that adoption. So, yes, we are looking at technologies where portability drives the market, where many component solutions are available to meet compact, highly efficiency chargers, and we're suggesting that that exact same technology be employed in a wider array of chargers, where right now the price drives the market instead of efficiency.

MR. ERDHEIM: So you're saying that all of the technologies would be applicable to all of the products?

MS. FOSTER PORTER: No. I'm saying that there are technology solutions found in high-tech products that can be adopted by other products in the marketplace, and part of

the reason why the standard was set not at the highest levels of efficiency of around 70 percent, but, rather, closer to 40 on market average, is because we wanted to be cautious about incremental cost equation, and that's why we show payback periods in most cases of less than a year, but certainly within the lifetime of products.

MR. ERDHEIM: Okay, thank you. So, let me just make the general comments and then I'll let you move on to Wayne. So, thank you very much for the workshop. Philips Electronics has three major business lines, healthcare, lighting and consumer lifestyle. And in all of those business lines, we have products that use battery chargers for lighting, we make emergency lights, and you've heard something about that. In our healthcare sector, we use portable oxygen tanks and nebulizers, and in our consumer lifestyle, we have toothbrushes, shavers, trimmers, portable DVD players, MP3 players, other portable consumer electronics, battery chargers themselves, which charge batteries, and baby monitors. And when you look, all of those products are very different. You've even heard some recognition, we have conductive has already been separated out, we have various usage patterns where some products are plugged in 100 percent of the time, some products are plugged in for a particular period of time, and some products are plugged in almost never. We also have

differences in cost and price, and we have differences in the utility. Some may say, “Well, we really don’t care that much about personal appearance or entertainment products,” but you might feel differently about products dealing with safety such as Emergency lighting or baby monitors, or health, dealing with portable oxygen tanks and toothbrushes. And we only make a small subset of products using battery chargers. And so I am stunned to see that we would have a proposal that would have basically one standard for all products, except for the Emergency lighting and for the inductively charged products, that standard can’t possibly address all of the different factors. In fact, the Department of Energy has put out a technical document that’s 600 pages long, with hundreds of pages of appendices, they spent a year working with manufacturers and others to develop this document, and I’ll tell you what I’ll tell them on Wednesday, I don’t think they still accurately reflected the marketplace. And as a result, I don’t think they have an accurate reading of what the potential energy savings are and what the potential cost impacts are. California doesn’t have the resources of DOE, it hasn’t put in the amount of time that DOE has, and if DOE is not able to get it right, I have severe doubts that the Department [sic] is going to be able to get it right. And so we would oppose duplicating the Department effort. The Department has every right to

participate, to want to effect the DOE process, you can do that not through this process, but by participating in the DOE rulemaking, you don't need this process, at least for consumer products, and we would strongly urge the Commission not to proceed with this rulemaking for consumer products. I would note that DOE has proposed – and, again, we don't know what they'll do, but they've got 10 different categories and we don't even think that they got that right. So, I don't see how one category or one with two special cases can accurately reflect the savings that you would get for particular products. Thanks.

MR. LEAON: Thank you very much, Mr. Erdheim. Wayne Morris.

MR. BECK: Let me just say a couple things in response to that. In terms of being upset, I never am upset a day after the Oakland Raiders can actually manage to win a football game. But, more importantly, more to the point, in terms of the timeframe that stakeholders have to comment, this is only the first of what will basically be three opportunities for stakeholders to comment. There will be a comment period that is, as we said, after this workshop, there will be a comment period after the Committee workshop, and, of course, once we issue what we call 45-day language of the express terms as it is in the regulations, there will be another 45-day comment period, so there will be multiple

opportunities to comment on the proposals as they move forward.

MR. ERDHEIM: May I respond quickly?

MR. BECK: Sure.

MR. ERDHEIM: So, I thank you for that, I realize there are other opportunities, my point is why didn't the Department [sic] set up a process where they were working with manufacturers from the beginning, rather than get into this process where we comment on something that someone else has done? I think that was a big mistake on the Department's [sic] part, you may say it's legal, that's fine, but I think it was a major mistake and, in fact, the Department of Energy did the exact opposite, they worked with manufacturers to try to get something right. It's not a legal question, it's a policy question. And I think you made a mistake, I think the staff made a mistake, in not ordering PG&E to work with us. We're not saying, "Let's have a meeting to talk about the details of this." Thank you.

MR. BECK: But as you noted, of course, we cannot order PG&E to go in and collaborate or have others to go and collaborate. We are getting this and we're following the process that we've used for multiple decades to set standards on a variety of different products, and obviously we're not going to come to an agreement on this, so there is

probably not a need to have too much back and forth on this, but, again, this is a process that we have utilized very successfully in the 30 plus years or whatever it is that the Commission has been setting standards.

MR. ERDHEIM: I agree we won't go back and forth, so let me make one final comment. I don't think you've ever had a rulemaking where you've dealt with so many different categories of products. You might have dealt with televisions, you might have dealt with refrigerators, but they're all one product; this is an inherently unique rulemaking, and I think you made a major mistake moving forward like this. Thank you.

MR. RIDER: This is Ken Rider. I would just like to clarify something that maybe I think is my fault in the presentation I gave. I was trying to explain as part of the rulemaking history, as a result of passing the 2008 rulemaking standards, there was a very open request to manufacturers and, in fact, I think it was on efficiency products, that a general data sheet was put up there for manufacturers to give input from testing of their products, to give feedback. It went way beyond the metrics that we're talking today, it included all sorts of measurements, so just a clarification on what I was saying within my presentation. I want to make it clear that I didn't go into that level of detail, but that's what I intended to present

when I discussed the events that occurred after the 2008 rulemaking to develop the test procedure.

MS. FOSTER PORTER: Suzanne Porter from Ecos. I just wanted to respond to the comment associated with whether or not the Energy Commission had ever adopted a standard that addressed so many different categories of products and, in fact, they have within the external power supply standard probably touched more different product types than what we're doing with battery chargers, and it's a fundamental approach to this standard as a horizontal policy approach to look at components of a variety of products that may necessarily touch tens of – if not hundreds of different product types, just the nature of this horizontal approach to improve plug loads.

MR. LEAON: Okay, Mr. Morris.

MR. MORRIS: Thank you, Mike. Wayne Morris with the Association of Home Appliance Manufacturers. I had a couple of questions for Suzanne and then a couple of comments that I'd like to make. Suzanne, if I could, a lot of the comparisons that you gave of the different types of products within your presentation, how does the proposal for the actual standards, for the general type of battery chargers, compare to the Candidate Standard Levels that the Department of Energy has in their TSD – I am sorry – Technical Support Document.

MS. FOSTER PORTER: It's a little difficult to say, in part because this was developed independently before DOE released its Technical Support Document on the 15th of last month, this had already been in development. So I don't want to answer definitively about the comparison. What I can say is, we focused on what I would call market transferable technologies that looked at technologies that exist in one part of battery chargers, but not in other segments because of price pressures.

MR. MORRIS: I noticed that in the Technical Support Document they noted that, although PG&E and Ecos had contacted them and asked for a number of levels of efficiency, that the Department responded that, in many cases, those types of technologies were not readily available, were, in fact, much higher priced, in order to accommodate them into the exact configuration of a battery charger for a general product. And so I'm curious whether the proposal that PG&E and Ecos had made to the Department of Energy, in response to the last workshop, is similar to the response or the proposal that you've got now.

MS. FOSTER PORTER: This proposal – and I have not reviewed the section that you're talking about, so I can't respond to it directly – but the proposal that we put in front of the U.S. Department of Energy is very similar to this approach.

MR. MORRIS: Okay, so then, my own personal feeling would be, then, that the Department of Energy's response to the Commission would be that many of these types of technologies are not transferable to a broad array of types of battery chargers, or would come at a significant cost increase, and that's what it seems to say from the TSD, and I'll be glad to get you the citation in the exact section. I guess I'm also curious about the cost numbers that you were showing for this type of a technology transfer. The Department of Energy has a fairly extensive amount of appendix work in their TSD, in which they go through how you go from a cost increase of an individual technology all the way upward through the supply chain, because they recognize in a battery charger, you're dealing with multiple levels in the supply chain. You're dealing with the actual manufacturer of the product, who buys the IC or the chip, or whatever, and then they sell it to an OEM, who then sells it to a retailer, who then sells it to a consumer, and there's a – they call it, not my words – they call it a mark-up at each phase. And I'm wondering if you used the same kind of mark-up trend that DOE used?

MS. FOSTER PORTER: I can't say in the DOE document whether or not we used the exact numbers, but we did use mark-ups.

MR. MORRIS: And so I guess my comment, then, to the

Commission would be that we be very careful about that, that if they spent, as Rick said, over a year, and probably close to a million dollars in developing this document – and, by the way, this is only half of the document, I only printed up the regular section and not the appendices, I put them on my computer, I figured I'd killed enough trees as it is trying to do this one – but the difficulty then being that, whatever mark-up situation that we use for looking at price increases, we ought to be using the same. I mean, I know that they didn't come out with theirs until probably significantly after Ecos had done their proposal, but I think that, when you redo it, which I understand you're going to for the actual staff report and all, I think it would be helpful if Ecos and PG&E did the same markups, significant, so that we're on equal footing, so that we can talk apples to apples on this situation. I was wondering, also, and maybe Rick touched on this just a little bit, but it seemed that, when you were looking at the products sort of above and beyond the bar line, or above and below the bar line, that there were a significant number of these that seemed to discount out, or make it very difficult to find nickel cadmium battery chargers, which, because of a number of very attractive characteristics of the product, tend to be the ones used in a large number of smaller, lesser priced consumer products. You know, it's one thing to make a

battery rechargeable product for a $500 iPod or a $2,000 laptop, but it's another thing to try to do it for a $29 rechargeable vacuum cleaner where the consumer can't exactly pay the kind of price increases for a nickel metal hydride, or, in some cases, even lithium. So, I was wondering, the cutoff seems to, if you will, almost eliminate nickel cadmium battery chargers. Was that sort of one of the situations that was used to draw the lines?

MS. FOSTER PORTER: We purposefully drew the levels such that all chemistries could pass. The principle driver, as I mentioned before, of why NiCd efficiencies tend to be lower than others are price, and there are ways that you can charge a nickel cadmium battery that are – that are tailored to the chemistry and are cost-effective. Simple ways to do that are to lower battery maintenance in no battery mode powers by having a low power circuit, and a standby circuit.

MR. MORRIS: Uh huh.

MS. FOSTER PORTER: Other ways include shutting off the charger when the battery is fully charged, so those are two very low cost ways to meet the standards. And NiCd chargers can do that just as easily as other chargers. It's just true in the market that they don't typically do it today because there's a split incentive where, you know, the manufacturers are trying to provide a low cost product and the ratepayers of California are paying for the extra energy

use associated with that initial low cost.

MR. MORRIS: Okay. And I was just wondering whether you looked at any issues that may occur with some of those technologies having to do with IP or Intellectual Property?

MS. FOSTER PORTER: Most of the solutions that we looked at were not intellectual property. I mean, these are widely available components that can be purchased at a relatively low cost.

MR. MORRIS: Okay.

MS. FOSTER PORTER: So, we're not trying to push to max technology, like I said before, that's a much higher level than what we're proposing. So those issues don't tend to come up.

MR. MORRIS: Right, I did catch that, thank you. I appreciate that. Thanks, Suzanne, that's all the questions I had for you. I just would like to make a couple of just general comments for the record, and appreciate the fact that the Commission has had this hearing and allowed us to work with the staff on this situation. I would reiterate that, Ken, appreciate the fact that you said that Ecos has had sort of an open call for data. The problem with that comes from manufacturers, is that the difficulty of divulging data to an individual outside of a governmental authority is very difficult for most manufacturers, and while an open call situation for data is a very nice thing,

if the Commission staff at any time would like to have data, they can call me, I think they know – probably Ken, you've probably got me on speed dial by now – and I would imagine that any time you would like to have data from our particular manufacturers on the consumer products, you know, all you have to do is ask. That's not a guarantee that we would supply it, I would have to check with my member companies, of course, but you know, we would definitely entertain that as a serious situation and we would try to work with the Commission as we have worked with the Department of Energy and other individuals on this type of situation. I think it is important that, as Rick said, that we not try to reinvent the wheel here on a lot of this information. I am cognizant of the resource situation, that the California Energy Commission and all agencies within the State Government have right now with budgets, with time, with furloughs of staff and other things, that we need to be spending your time, particularly, I would think, the citizens would want to be spending your time in the best way possible. And while I do understand there is energy to be had here, I think it's also important to recognize that manufacturers do need lead time in order to re-manufacture. I do understand that when someone says that external power supplies are available on the market. And as we have testified in this very room on several occasions, and I

think you can look back in transcripts and find it, I've stood here at this microphone and asked the Commissioners to consider that an external power supply and a battery charger are two different things. An external power supply is, as has been stated here by a number of individuals, rather a commodity item. You basically can, as a manufacturer of fax machine or a set of computer speakers, you can go to open a catalogue and you can look at the requirements that you may have for that type of thing, and you can order one that fits your needs from one of the manufacturers, one of the larger manufacturers; that is not true with battery chargers. Battery chargers have very inherent and specific needs associated with the design, and so it has to be designed to fit the special case of what that battery is in terms of the battery chemistry, in terms of the usage patterns that the consumer is going to see, the charge rates that the consumer is expecting to see charged, the lifespan of the product involved, the price point the product needs to meet in order to satisfy the consumer demands, and a number of other factors associated with how the product is used and designed. And so, consequently, it's not a commodity item, and consequently, if the agency were to put forward a change to a regulation, it would take manufacturers a significant amount of time to redesign that battery charger. I appreciate – Suzanne says there are

these available technologies, and there probably are, but to fit them, to form fit them to a specific application such as a cordless rechargeable vacuum cleaner, or an electric shaver or something, is going to take hundreds and hundreds of man hours of design time on the part of the manufacturers. I would say that, at the very least, we would be looking at two to two and a half years for redesign time within the industry in order to meet such a requirement. I certainly would – I would like to survey the industry and we will put that into our written comments, but I would say the one-year period of time that has been suggested here is absolutely not enough for our industry to respond to the situation. We are, after all, in the middle of an economic recession. Our industry has been extremely extremely hard hit by this recession. Many of our manufacturers have had significant layoffs of staff, many of them are down in their engineering staff, the actual viability of many of these companies is in question. And to put millions of dollars into the retooling and into redesigning these products, coming on the hardship of the economic recession that we're under, would cause a situation that I know the Commission would not like to see, and that is a reduction in the number of products on the marketplace, a reduction in the survivability of companies that are able to meet this type of situation. I would also ask the staff

that, as they are considering the cost side of this situation, to not forget that the cost of the actual redesign of the companies, that is, the engineering hours that have to be put forward into the situation, as well as the capital costs – Rick alluded to this in terms of remanufacturing molds – molds depend upon volume, for some high volume products, molds can cost in some cases upwards of hundreds of thousands of dollars, that's a significant capital cost that manufacturers would have to put into place in order to meet these new requirements, as Rick Habben pointed out. The products will likely grow in their size, that will also grow packaging, which will then mean that fewer products go onto trucks, which means that, then, transportation per mile per product is a higher cost, so you end up with a trade-off situation here. Now, I'm not trying to suggest that the trade-off is maybe 1:1, but it needs to be factored in if you're looking at the overall sustainability of the product. I would also mention that any one of these changes will require manufacturers to take everyone of these designs back through the testing organizations. You know, it's fine for an EPS manufacturer to take his product to the testing organization, they can very often do it as a family listing, so they can go to, for instance, Underwriters Laboratories or Inter-Technical or CSA, to get a safety listing for their product; they can do

so in a family arrangement from X number of watts to X number of watts, and they can vary that in between, accordingly. They very often will do a high and a low and a medium. With battery chargers, it's different. Every individual battery charger will have to be tested by the safety agencies individually according to its individual needs, which means every one of these new designs, hundreds and hundreds of them, as the Department of Energy has put forward in the TSD, will have to have safety certification. Those safety certification costs are fairly significant. They can range anywhere from $20,000 to $50,000 per product, they are unique to every individual model, and I would ask that, as the staff considers the cost increases, that they would allow for the cost of the testing safety certification, as well. Not to mention the fact that the Department of Energy and probably California will require outside third-party certification for the energy efficiency of the product, which is another cost on top of this. So, it's very important that the cost is not just the cost of an IC chip, it's not the cost of going and getting a timer chip and putting in the product, it is a much larger cost associated with this situation. And I don't want to minimize that at all and want to make sure that whatever we do, we don't lose track of the situation here. We'd certainly like to work with the Commission, we have worked

with them before on a lot of energy efficiency standards. I've certainly been here to California now for almost 15 years working on various energy efficiency requirements. I would mention that the statement was made earlier that it's difficult to have workshops in which you involve industry; I've not found that to be the case with the Commission over the years, my experience with the Commission is that, when the Commission wants to have a workshop and invite industry in – in the very very early stages – they've always been open to doing that type of thing. It seems that, in the last few years, it's become a new situation where some of the outside parties are making, if you will, sort of blind presentations to the Commission without involving industry, that we have this antagonistic or adversarial relationship, and I don't think that necessarily has to happen. I know that there were a number of workshops that were held with the external power supply rulemaking in the very very early stages, in which industry was invited in to comment on technical issues, and that wasn't done on this case, and I find that to be a bit surprising. And I'm certainly hoping that, as we move forward, that type of situation is not one that would continue. We've always had a very good relationship with the staff at the Commission, they certainly know how to reach us, now, I recognize that we only represent one small segment of the battery charger

industry. The Department of Energy, I believe, alludes in the TSD to about 35 different trade associations that represent manufacturers of battery charging products. I'm hoping that they are aware of what's going on through this rulemaking. I'm rather surprised not to see a large number of those other trade associations here. Maybe they're represented on the telephone, I would certainly hope so. But I think it's important that we reach out and make sure that we have all the stakeholders involved. I know the Commission has done a great job of that in the past and we hope that they continue in the future. Thanks very much.

MR. LEAON: Thank you very much, Mr. Morris, for those thoughtful comments. Do we have any other blue cards in the room? Okay. All right, the first blue card is from Joanna Mauer.

MS. MAUER: Thank you, I'm Joanna Mauer with the Appliance Standards Awareness Project, and we just want to express our support for the CEC conducting this rulemaking and we think that it's important, even though DOE is concurrently conducting a rulemaking that will eventually establish Federal standards for battery chargers. And I just wanted to briefly emphasize three points that I believe have already been made today regarding the significance of the CEC rulemaking in the context of the Federal rulemaking. The first is that this rulemaking does include a broader

scope of coverage than the DOE rulemaking, in that it covers battery chargers for both consumer and non-consumer products, whereas the DOE rulemaking is only addressing battery chargers for consumer products. And this means that this rulemaking has the potential to achieve significant additional energy savings for California beyond what the DOE rulemaking will be able to achieve, due to the broader scope of coverage. The second is that the strong CEC standard that results in significant cost-effective energy savings can influence the outcome of the DOE rulemaking and the eventual Federal standards, and we hope that the CEC rulemaking could at least set a floor for eventual Federal standards. And the third is that these potential standards that the CEC is considering would like go into effect about a year earlier than the Federal standard, which would mean that California would accrue an additional year of savings, and given the potential impact of the California standards on the national market, could yield additional savings on a national level, as well. And while this would only be one year of additional savings, it could be significant due to the high annual sales volumes of these products that we're examining. Thank you very much for the opportunity to comment.

MR. LEAON: All right, thank you very much. The next blue card is from Larry Albert.

MR. ALBERT: Thank you. Larry Albert from Stanley/Black & Decker, representing the Power Tool Institute. The first question are basically staff questions, I think, and they relate a little bit to confirming the schedule. As I understand it, the comments – again, this is a PG&E proposal to the CEC. Is that correct?

MR. LEAON: That is correct.

MR. ALBERT: All right, so the CEC is not making a proposal at this time, that will not be made until November 15th?

MR. LEAON: On November 18th, we'll have the Efficiency Committee meeting with both Commissioner Eggert and Commissioner Byron in attendance, and the focus of that meeting will be a staff proposal based on PG&E's proposal and the feedback we receive from industry and other stakeholders in regard to that proposal.

MR. ALBERT: So you know this is a PG&E proposal because there are no other proposals before the CEC staff for consideration, it is essentially a CEC proposal?

MR. LEAON: No, it is a PG&E proposal. But, as you say, there are currently no other proposals before the Commission, but we are seeking input and feedback in regard to the proposal, and we are going to shape any recommendations that we bring forward to the Efficiency Committee.

MR. ALBERT: So any stakeholder could make a proposal and that the CEC would consider it on an equal basis to that proposed by the PG&E proposal?

MR. LEAON: Well, I think it would have to be supported by the necessary research and documentation that would support it. Obviously, there has been a lot of effort put into PG&E's proposal going into the committee workshop.

MR. ALBERT: So the public and stakeholders would become aware of the staff proposal on November 18th? Or did you mention that there was a release on November 15th?

MR. LEAON: We will release the staff report prior to the committee workshop on the 18th. I would like to have that available a week ahead of time, that is our goal.

MR. ALBERT: That would be preferable to this situation. So, one of the questions is that, the comments that are due back on October 29th, are they due back to the CEC or back to PG&E?

MR. LEAON: I'm so sorry, back to staff – back to CEC staff.

MR. ALBERT: Okay, on PG&E's proposal?

MR. LEAON: Yes, comments on their proposal and any other feedback that you would like to provide.

MR. ALBERT: Has the CEC had an open call for proposals with respect to Energy Efficiency Battery Chargers? Or was PG&E the only entity that was contacted?

MR. LEAON: Well, to my knowledge, PG&E and the other utilities, you know, worked on this proposal. As to other entities, whether an industry or an environmental group, I'm not aware that any proposal was solicited specifically.

MR. ALBERT: But there were no open call for proposals that any entity could have proposed comparable to the one that PG&E did? I mean, it was not restriction on who could have done it and it was made – the public was made aware of the fact that the CEC was seeking proposals for regulatory schemes for battery chargers?

MR. RIDER: If you don't mind, Mike, maybe I can speak to this.

MR. LEAON: Yes, go ahead.

MR. RIDER: Mike is relatively new to the Appliance Efficiency Program. In 2007, we had a Scoping workshop where we did solicit very openly various proposals. The only proposal we received was for a test methodology from, again, PG&E at that time. We decided we needed to figure out how we would test these before we figured out how we would regulate them, so, as a result from the 2007 Scoping workshop, we received a proposal -- and that was open to everyone –- we received a proposal for a test methodology, and PG&E was behind that proposal, and has followed-up now with a regulatory proposal. So, it's never been shut, the

timing – it's been a while since that 2007 open solicitation, but, you know, public feedback, you're not restricted in any way in how you provide feedback on this process, and everything you give us will inform the staff report and we'll consider that in the staff report. But I just wanted to go back, that 2007 was really when we openly asked for it. And, again, maybe that's the fault in my history presentation, but I will emphasize it.

MR. ALBERT: While you're up there, past November 18th, you went through the schedule, but could you just repeat that for –

MR. RIDER: Yeah, let me just go ahead and pull up that slide real quick. So, yeah, we have the staff report on the due date of November 15th, November 18th is the workshop, and then after that it's really an undisclosed amount of time because, again, we're going to solicit feedback. Depending on where we think we are with the proposal, if we think we've got a good thing, a decent proposal, I think we're looking at a rulemaking in December. Again, that is a tentative date, it depends on the feedback that we gain from today and from post that committee workshop.

MR. ALBERT: So, presumably, 45 days after whatever time in November you issue your rule, proposed rule, would become the final rule, then manufacturers would have a year

to comply?

MR. RIDER: It could be. There is even within this process, so you have 45 days to submit comment on the final rule. At that point, you can disagree with what we've proposed, and if it is a very legitimate concern or you point out an obvious mistake, perhaps, that we made, then we have the option of not making that the final rule and we can reissue yet another proposed rule. But, in this formal rulemaking process, it's very rigid, we have to follow very strict guidelines. For instance, if you submit a comment after the 45-day period, it's questionable whether we can consider it or not, and so we prefer – the reason we do these workshops, like the one we have today, is to get the feedback earlier, sooner rather than later. I think that's consistent with what industry has said. We want to involve you guys sooner rather than later.

MR. ALBERT: Right, and again, I hate to bring up a subject again, but the failure to provide advance notice with respect to the agenda, with respect to content, was a serious obstacle in the way of responsible stakeholder involvement which is, I think, what the Commissioner mentioned was one of the objectives. Thank you. I have a question on the specific proposal with respect to the payback analysis –

MR. SINGH: Hang on, Larry. This is Harinder Singh.

You know, one of the things is that our process is open and it's not only the November 18th, but any time you can set up a meeting with us, and we are always open to comments, any discussions, so whenever you have time, tell us, we will be available to you and any of the industries who wants to discuss any standards or any issues with us. I just wanted to mention that. Thank you.

MR. ALBERT: Thank you, Harry. I want to point out to you, just to follow along with what Wayne said earlier about past work that we've done specifically with you on the test procedure, it was very productive, it was very transparent, it was very collaborative, right? The tone that was set at the beginning of the hearing today with respect to the unavailability of materials set the stage for a much more strained relationship, right? And I hope this is an aberration in the overall relationship that the Commission has with manufacturers going forward.

MR. SINGH: Thank you.

MR. LEAON: This is Mike. Let me just respond to that briefly. Yes, this workshop today was originally scheduled to be the Committee Workshop, but in looking at the proposal and the amount of information that was contained in the proposal, we decided that it would better serve the stakeholders to make this a staff workshop so we could facilitate input on what we were considering prior to

taking that to the efficiency committee meeting, so we made an effort to include an additional workshop into the process, in order to better engage industry and other stakeholders in the process, and your point about the materials not being available ahead of time, that, I think, is an aberration, that is not something that – that's not how we want to conduct business. And I don't think we'll see a reoccurrence of that particular challenge, and I recognize it was a challenge, and it would have been more productive to have had those materials ahead of time. But our objective in making this a staff workshop today was to provide additional opportunity to comment and additional time to look at what was being proposed.

MR. ALBERT: A question for, I think, Suzanne regarding the proposal. Again, to follow-on with a couple comments I made earlier with respect to the DOE TSD, did you compare the payback analysis using the PG&E proposal, your proposal, with that, which would be achievable employing the regulatory methods that were addressed in the TSD?

MS. FOSTER PORTER: We have not had the availability to do an analysis comparing our proposal to the DOE proposal.

MR. ALBERT: If the DOE proposal were to prove to be as effective, or more effective, why would that not be a candidate proposal instead of the PG&E proposal?

MS. FOSTER PORTER: We developed an independent proposal ahead of U.S. Department of Energy, which we've had – we've been working on for some time, so I would just say this is the proposal that we developed based on our research, which is different from DOE's proposal.

MR. ALBERT: Then I guess it's really a Commission question, a staff question. If the Commission does an analysis of the DOE TSD and finds that that regulatory direction would prove to be more effective with respect to payback, all right, would it not consider that as an alternative to PG&E?

MR. LEAON: Well, I think some of our objectives have been – we've stated earlier today, and that is to realize the efficiency savings that could accrue to California before the Federal DOE standards take effect. On the question of whether they're more effective, should we reach that conclusion, then I think that is something we would have to look at closely in regard to what we're proposing to do. But I think we also want to recognize the amount of work that has gone into developing the PG&E proposal, as well, and following up to our work on the testing procedure, and this rulemaking flows out of that process, and, again, another objective is to influence any Federal standards based on the work that we've performed.

MR. ALBERT: Thank you for your response.

MR. LEAON: Thank you. Do we have anymore blue cards in the room? Yes, please come on up.

MR. HABBEN: This is Rick Habben from Wahl Clipper. I have, really, it's just one comment here that I wanted to bring up, and kind of going back to the issue that Suzanne was talking about, about the technology that exists for the products that are lower end, that do not have the circuitry in them to meet the existing requirements, and I guess where I'm coming at with our particular company and our products is – there are two issues – one is, I have products, I think, that are going to be very close to meeting the energy efficiency in the active mode and the standby mode, according to your requirements, I'll have to do testing, but just looking at the overall numbers, I think it's going to be close. But, regarding the maintenance mode of setting it at .5 watts for your maintenance is going to be extremely difficult to meet with the lower end, lower cost products. And I've already stated, and I don't want to belabor the issue, regarding the additional cost and the real estate of putting that into existing products, but there's one other issue and item that I didn't think about, and that is, with our beard and mustache trimmers, in order to meet the lower price points to give all consumers opportunity to have these products, and the affordability, many of these products are made with one battery in them, and it's either, in some

cases, the nickel metal hydride, or a NiCd battery. That battery voltage is 1.2 to 1.5 volts, typically 1.35 for both of those. Your IC circuits, in order to run in the power – and correct me if I'm wrong, Suzanne – but normally it's above that type of level. So right now, I have battery chargers that are producing about 1.5 volts and 150 amps. In order to use these new circuits with the cutoff, I'm going to obtain a charger that's going to be up around 3 to 5 volts to run the IC circuits. So, now I'm buying a charger that's actually going to produce more voltage and potentially have more waste because I have to run the circuit. That's on top of the additional cost of the circuit and the real estate of where to put it in existing products. So, I guess I say all that to say that, you know, I believe this proposal, we really need to think about what we're doing to these low end products with this proposal, and the cost, and the energy efficiency –- the entire efficiency -- on the end products.

MR. LEAON: Okay, thank you for those comments. Any other comments in the room? Ken, if you could open the phone lines and see if we have any comments on the phone?

MR. RIDER: All right, the lines are open.

MR. LEAON: Any comments from anyone on the phone?

MR. RIDER: Only crickets.

MR. LEAON: Okay. Last call for comments on the

phone. All right, okay, well, that concludes our workshop. I want to thank our presenters today. I thought we had some very informative presentations and, in particular, I want to thank our PG&E representatives for presenting the Case Report today; obviously, that was the focus of the workshop. And I encourage stakeholders to submit written comments. And in regard to any specific technical comments, if you can support those with data, we would find that most helpful. I certainly heard your concerns about process and the process evolved here, and I recognize it's a very aggressive timeline before we get to the November 18th Committee meeting. I will be briefing the Efficiency Committee on the results of the workshop today, and I will certainly share your concerns and also characterize the type of feedback we have received today. And, again, I want to thank all the stakeholders for your valuable comments and insight, which will help us in developing the Staff Report regarding the proposal presented by PG&E. And, again, I urge you to submit written comments, and I believe the deadline for that was October 29th –

MR. RIDER: The 29th.

MR. LEAON: -- yes, thank you. And that wraps up our workshop. Thank you for your participation.

MR. RIDER: Just one more thing. I would really strongly encourage, if you're not part of the Listserv that

you join the Listserv. I can give details to anyone who is interested afterwards. For instance, when we post these presentations, if we post these presentations, which I think we are –

MR. LEAON: Yes, we will be posting the presentations.

MR. RIDER: -- all right, then you'll get an e-mail letting you know that has been added to the docket. And, in addition, breaking news, there is a website somewhere – and I can get you guys the link – where all this information already appears, the agenda, the notice, and the PG&E's case study. And I can give you that website afterwards, too, because I'm not sure what it is yet. But I saw it online, so it's good to go. And eventually all of your comments, if you choose to docket them, will appear there, as well.

MR. LEAON: All right, thank you everyone for your participation today. The workshop is adjourned.

[Adjourned at 3:12 P.M.]