

BEFORE THE
CALIFORNIA ENERGY COMMISSION

DOCKET	
11-IEP-IF	
DATE	11-20-11
RECD.	11-21-11

In the matter of)
)
Preparation of the) Docket No. 11-IEP-IF
2011 Integrated Energy Policy Report)
(2011 IEPR))

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

WEDNESDAY, JULY 20, 2011
9:00 A.M.

Reported by:
Peter Petty

 ORIGINAL

APPEARANCES

Staff Present:

Panama Bartholomy
 Martha Brook
 Mike Leason
 Bill Pennington
 Peter Strait
 Gabriel Taylor
 Dave Ware

Presenters/Panelists (*Via WebEx)

Steve Galanter, Southern California Edison
 Jon McHugh, PE McHugh Energy
 *Cathy Fogel , CPUC
 *Jordana Camarata, CPUC
 Eliot Crowe, Portland Energy Conservation, Inc.
 Nehemiah Stone, Benningfield Group, Inc.
 Dr. G.P. Li, UC Irvine
 Randall Higa, PE, LEED AP. Sr. Engineer, Southern California Edison
 Konstantinos "Kosta" Papamichael, PhD, California Lighting Tech Center, UC Davis
 Dr. Carrie Armel, Precourt Institute for Energy Efficiency, Stanford University
 Jonathan P. Williams, Intel Corp.

Also Present

Public Comment

Dana Waters, Air Resources Board
 Mike Gable, Gable Associates
 Mike Keesey, SMUD
 George Nesbitt, Environmental Design/Build
 Daniel Hamilton, SMUD
 Smita Gupta, Itron
 Manuel Alvarez, Southern California Edison
 George Nesbitt, Cal HERS
 Karl Johnson, University of California
 Patrick Splitt, App-Tech
 Mike Gable, Gable Associates
 Mike Keesee, SMUD
 *Bruce Ray
 Daniel Hamilton, SMUD
 Pat Eilert, PG&E
 Barbie Beaudette

APPEARANCES

Also PresentPublic Comment

*Jim Jungwirth

Jim Francisco, Sierra Consulting

Jelisaveta Gavric, California Association of Realtors

Robert Raymer, CBIA

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

INDEX

	PAGE
Welcome to the Achieving Energy Savings in California Buildings Workshop - Panama Bartholomy, Deputy Director, Efficiency and Renewable Energy Division	7
Panel Discussion: Zero Net Energy in Newly Constructed Buildings - Martha Brook, Senior Mechanical Engineer, High Performance Buildings and Standards Development Office, CEC	10
Zero Net Energy Vision	
Jordana Camarata, Senior Analyst, Energy Efficiency, CPUC	15
Zero Net Energy Definition	
Jon McHugh, P.E., McHugh Energy	29
Zero Net Energy Pilots	
Jeff Gleeson, Customer Energy Solutions, Buildings, Pacific Gas & Electricity	50
Steve Galanter, Manager, Strategic Planning and Technical Services, Customer Energy Efficiency & Solar Division, Southern California Edison	57
California's Building Energy Efficiency Standards: The Road to Zero Net Energy	
Cathy Chappell, P.E., Director, Heschong Mahone Group, Inc.	65
Public Comments: Zero Net Energy Buildings	82
Panel Discussion: Achieving Energy Efficiency in Existing Buildings - Bill Pennington, CEC	111
Current Public Goods Energy Efficiency Programs for Existing Buildings	
Cathy Fogel, CPUC	118

INDEX

	PAGE
Plans for AB 758 Residential Needs Assessment	
Eliot Crowe, Portland Energy Conservation, Inc.	137
Plans for AB 758 Non-Residential Needs Assessment	
Nehemiah Stone, Benningfield Group, Inc.	145
Panel Discussion: Reducing Plug Loads in Buildings	
Meeting Energy Efficiency Goals Through Standards	190
Randall Higa, PE, LEED AP. Sr. Engineer, Southern California Edison	192
The Big Picture: Importance of Plug Loads in Meeting Energy Efficiency Goals	
Dr. G.P. Li, UC Irvine	198
Lighting: Intersection of Plug Load and Building Efficiency Mandates	
Konstantinos "Kosta" Papamichael, PhD, CA Lighting & Technology Center, UC Davis	213
Beyond Standards: Alternative Approaches to Appliance Standards for Meeting Energy Efficiency Goals	
Dr. Carrie Armel, Precourt Institute for Energy Efficiency, Stanford University	223
Jonathan P. Williams, Government Affairs, Intel Corp.	233
Public Comments: Managing the Growth of Plug Loads	242
Adjourn	264
Certificate of Reporter	265

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

2 JULY 20, 2011 9:00 A.M.

3 MR. TAYLOR: Good morning everybody, thank you
4 for joining us. This is the Achieving Energy Savings in
5 California Building Staff Workshop on our draft staff
6 paper.

7 And to get started with a little bit of
8 housekeeping here, those of you who are not familiar with
9 the building, the closest restrooms are located out to
10 the left and to the right. And you can ask the security
11 guard if you get lost, it's pretty easy. There's a snack
12 bar on the second floor.

13 And in the event of an emergency, and we do have
14 fire drills on occasion, please follow the employees out
15 the appropriate exit, there are two exits to the
16 building, and we will gather at the park caddy-corner
17 across the street. Please proceed calmly and make sure
18 you stay with the employees.

19 Today we are here to discuss the staff draft
20 paper here, so we are very interested in your comments
21 and your input on this paper as we move towards
22 finalizing it at the end of August.

23 The comment due date is at the end of next week,
24 about ten days from now.

25 I am the Project Manager for the Efficiency

1 Division of this work paper and so if you have any
2 questions about logistics or how to get your comments in,
3 please feel free to call me. My contact information is
4 on the workshop notice.

5 And now I'd like to introduce our Deputy Director
6 of the Efficiency and Renewable Division, Mr. Panama
7 Bartholomy.

8 MR. BARTHOLOMY: Good morning everybody, thanks
9 for coming to the Energy Commission today. Not too many
10 new faces to energy efficiency around the room, so it's
11 good to be at this homecoming with all of you.

12 We've got a great set of panel members and panels
13 for you this afternoon and I really appreciate you folks
14 coming up to Sacramento or coming across town to attend.
15 And we would really, as Gabe said, like to have your
16 input into this process today, as well as into the final
17 staff paper.

18 Today's work really builds upon a good 30 years
19 of work around energy efficiency policy here in the State
20 of California. And what we're trying to do today is
21 taking it really to the next level of discussion,
22 building upon such great work as the California Public
23 Utilities Commission sort of long-term strategic plan for
24 energy efficiency.

25 We are taking some of the key goals out of the

1 Governor's Green Jobs Action Plan, zero net energy
2 buildings, deep reduction in energy consumption from
3 existing buildings, and strong appliance standards to
4 achieve significant reduction to energy consumption, and
5 focusing in on those in this year's Integrated Energy
6 Policy Report or IEPR.

7 The staff paper covers, in some detail, those
8 distinct goals as well as the interaction between those
9 goals. In today's panels you'll see, also, deep
10 conversation as well as the interaction between each of
11 those policy goals.

12 The first panel's going to be moderated by our
13 very own Martha Brook and be covering zero net energy in
14 newly constructed buildings, with a focus on some of the
15 policy goals, a discussion on definition. And you'll
16 notice in the staff draft paper the Energy Commission is
17 attempting a definition of ZNE in the staff draft, that
18 we would like to publish in the fall.

19 And then a discussion of some of the pilots that
20 we're already seeing in California and how the role of
21 ZNE will be carried out within the 2013 building
22 standards updates, as well as future updates.

23 We are then going to move on to a discussion,
24 right after lunch, on achieving energy efficiency in
25 existing buildings. This will include a discussion of

1 current programs already underway in the State of
2 California and then moving towards the next generation of
3 policies around existing buildings. In particular, the
4 partnership between the Public Utilities Commission and
5 the Energy Commission around AB 758 and the reduction of
6 energy consumption in existing buildings, and a
7 discussion about some of the activities over the next
8 nine months or so under AB 758 for both commercial -- for
9 both non-residential and residential buildings.

10 We will then take a short break and we'll come
11 back, and we'll have a discussion about standards, goals
12 and policies around plug loads and appliances, some of
13 the excellent work going on in some of our universities,
14 some of the hopes and dreams of our investor-owned
15 utilities and their support of our activities over here
16 in California, and then moving forward into some of the
17 plans for the future around appliances standards.

18 I just want to thank you all very much for
19 showing up today. It's going to be -- we've brought
20 together a great set of panels.

21 I very much want to thank the staff of the
22 California Energy Commission. And it's incredibly tough
23 right now to be a State worker. So, if folks would
24 indulge me and give a quick round of applause to all the
25 staff that worked to bring this group together today, I'd

1 really appreciate it.

2 [Applause]

3 DEPUTY DIRECTOR BARTHOLOMY: Thank you. Thank
4 you to the staff, thank you very much for the wonderful
5 speakers we have.

6 And with that I'm going to throw it over to
7 Martha to start the conversation on zero net energy.
8 Thank you very much.

9 MS. BROOK: Thanks Panama. Okay, I'm going to
10 have to negotiate a little bit here. I need to find my
11 presentation. Are they up here in this little folder?
12 Okay, and then do I need to reshare the desktop?

13 Okay thank you very much. So, I'm just going to
14 kind of queue up our panel discussion. I want to spend
15 most of this morning talking with you.

16 So, first, let me just talk about how we're going
17 to organize the panel. Each of the speakers that we've
18 invited is going to give about a 15-minute talk and then
19 I'm going to pose to the panel just a small set of
20 questions that I've pre-thunk, and that will sort of
21 start the discussion flavor of the session.

22 And then we'll open it up to all of you to come
23 and join us, and ask questions, and provide stimulating
24 comments. And that's how we'll spend the next 90
25 minutes.

1 But the first thing I wanted to do was sort of
2 just talk about why zero net energy in California. And
3 Panama sort of keyed up a number of policy goals that
4 zero net energy buildings fit into.

5 One of the ways that it's really easy to justify
6 zero net energy is with the California Global Warming
7 Solutions Act that was passed in 2006. And the Energy
8 Commission, the Public Utility Commission and, of course,
9 the Air Resources Board, along with numerous
10 stakeholders, I'm sure some of you also participated in
11 that activity around the scoping plan for AB 32.

12 And the ultimate goal that was established in
13 that planning document was to reduce the greenhouse gas
14 emissions in the State to 1990 levels by 2020; a very,
15 very aggressive goal.

16 Then there's also, if that's not aggressive
17 enough, sort of an aspirational goal also published in
18 that plan that says that we should reduce greenhouse gas
19 emissions to 80 percent below 1990 levels by 2050. So,
20 you know, that's a deep, deep dive.

21 And that sort of allows us to think about things
22 in a new way. So, just to kind of put the buildings,
23 residential and commercial buildings, in the context of
24 the State's greenhouse gas emissions, you know, we -- we
25 think that buildings is about a quarter of the pie. If

1 you look at all of the emissions in the State
2 transportation is the biggest chunk, buildings in the
3 industrial sector are the second biggest chunk, and then
4 the agricultural and miscellaneous that sort of rounds
5 out the pie.

6 One of the things that's important about the
7 second chart down here is this is sort of how the AB 32
8 scoping plan maps out the reduction in greenhouse gases
9 shared out by sectors.

10 So, you can see the electricity and natural gas
11 sector, which is where residential and commercial
12 building emissions fall out is almost 30 percent of the
13 pie. And 70 percent of this lavender pie section is
14 residential and commercial buildings.

15 So, a significant amount of the greenhouse
16 reduction share and especially the early action plans in
17 the scoping plans are focused on renewable energy and
18 energy efficiency because right now those look like the
19 most cost-effective way to achieve the greenhouse gas
20 emission reductions.

21 This next slide I've used for several years and
22 it's just illustrative, so you don't really need to look
23 at the numbers. And I'm just going to -- it just allows
24 me to sort of talk about why we need to have a paradigm
25 shift when we think about building energy consumption and

1 building energy efficiency.

2 So what I did here is that up until about
3 whenever I built this slide, about 2007, the jagged line,
4 that's historical energy usage in the State transferred
5 into greenhouse gas emission metrics.

6 And then the trend line going forward into the
7 future is just a simple trend line based on that
8 historical usage in the State.

9 And the yellow horizontal and vertical lines sort
10 of says what -- how the building sector would meet the AB
11 32 1990 levels by 2020 goals, just within the building
12 sector.

13 So, if we draw the 1990 level over to 2020 that's
14 the wedge, that 40, approximately 40 million metric tons
15 of greenhouse gas emissions is that wedge that we would
16 have to reduce to meet that level.

17 And this is sort of a conservative estimate for
18 the building sector because, as I said, the building
19 sector is expected to achieve more than its share of
20 greenhouse gas emission reductions because of the fact
21 that efficiency is one of the most cost-effective way to
22 reduce greenhouse gas emissions in the State.

23 So, just assuming that we have to meet that it's
24 very challenging because one of the things about that
25 trend line is that it already assumes that we're going to

1 be doing all of the things we have been doing
2 historically for energy efficiency in the State.

3 So, all of the billions of dollars that we've
4 spent on public efficiency programs is already accounted
5 for in that trend line, that's the top of that big green
6 wedge. So, we actually have to do more and change,
7 basically shift, completely, to a different paradigm in
8 order to achieve that wedge reduction. So I think that's
9 really important.

10 And just to put it in the context of greenhouse
11 gas emissions, that wedge is approximately 80 percent of
12 all the passenger cars in California today. So it's a
13 challenge and one of the reasons that we've adopted the
14 zero net energy goals is because we think we can
15 partially meet that challenge.

16 Now, of course, with the zero net energy goals
17 that we're going to talk about this morning are really
18 focused on newly constructed buildings. That will be a
19 small part of this wedge because there's so many existing
20 buildings in the State, and we'll spend the afternoon
21 talking about existing buildings and what we want to
22 achieve to make up the rest of this wedge reduction that
23 we need to accomplish.

24 So, that sort of sets the stage for what we want
25 to talk about this morning. And so the way that we sort

1 of shaped this panel is that we have Jordana Camarata
2 from the Public Utility Commission. She's going to talk
3 about the California's zero net energy policy vision.

4 And then Jon McHugh, who's been part of an
5 informal working group to discuss the zero net energy
6 definition is going to present a summary of what this
7 working group's been discussing.

8 And then we're going to talk about some of the
9 pilot activity that our investor-owned utilities have
10 been planning and implementing for zero net energy
11 pilots.

12 And then, finally, we're going to talk about what
13 we're doing in our energy efficiency standards to get on
14 the path to zero net energy.

15 So first up we have Jordana and I'm going to run
16 her slide deck. Jordana's going to -- she's on the phone
17 and we need to unmute her line, and then I'll bring up
18 her presentation. One moment.

19 MS. CAMARATA: Okay, can you hear me?

20 MS. BROOK: We can.

21 MS. CAMARATA: Okay, excellent.

22 MS. BROOK: Hold on one minute, I want to
23 introduce you and then we'll --

24 MS. CAMARATA: Sure thing.

25 MS. BROOK: Thank you. Well done. Okay, Jordana

1 Camarata is the Senior Regulatory Analyst in the Demand
2 Side Program Branch at the California Public Utility
3 Commission.

4 She's involved in the oversight of the investor-
5 owned utilities' commercial energy efficiency programs
6 for existing buildings and new construction.

7 She also engaged with the implementation of the
8 California Energy Efficiency Strategic Plan and launched
9 the Zero Net Energy Action Plan for the commercial
10 sector.

11 And now we have Jordana.

12 MS. CAMARATA: Great. Is the volume okay on your
13 end; can you hear me?

14 MS. BROOK: We probably want you a little louder,
15 but I think we're going to try to do that on our end.

16 MS. CAMARATA: Okay, how's this?

17 MS. BROOK: In the back we're good? Yeah, we're
18 good.

19 MS. CAMARATA: Okay, great, I'll talk up. Great.
20 All right, well, thank you everyone. Again, my name's
21 Jordana, Jordana Camarata, I work in the Energy Division
22 at the California Public Utility Commission.

23 And today I'm going to be talking about the zero
24 net energy vision that we have here at the CPUC and
25 specifically talking a little bit about the Commercial

1 Building Action Plan that we have.

2 Next slide. So, a quick overview of the
3 presentation, I'm going to talk a little bit about the
4 strategic plan and zero net energy. Some of the programs
5 that kind of follow suit from the strategic plan, that
6 carry over that same vision.

7 And then I'm going to talk about the Zero Net
8 Energy Action Plan, specifically the portion of it that
9 talks about new construction.

10 The next slide. I have this slide up here to
11 kind of give everyone a sense of where there activities
12 fall within the CPUC. So, as Martha mentioned, I work in
13 the Demand Side Programs Branch and there's three
14 sections within that branch, residential programs, non-
15 residential programs, and then distributed generation in
16 California's Solar Initiative.

17 And I work -- and the Zero Net Energy Action
18 Plan, these activities for non-res, they occur within the
19 non-residential programs branch. As you can see
20 highlighted, one of the things I do is the strategic plan
21 activities for non-residential and then I also oversee
22 energy efficiency non-residential programs and portfolio.

23 The next slide. So, I'm going to talk a little
24 bit about the strategic plan, you can skip through that
25 kind of Title V.

1 So, the strategic plan, you know, Panama
2 mentioned it and Martha, as well, it really sets forth
3 zero net energy vision for California. It was adopted
4 via a decision in 2008 and it gives us a road map of how
5 to think of energy efficiency through 2020 and beyond.

6 It has major elements of market transformation.
7 And one way that we've been building off of this is we've
8 been creating action plans for the different chapters and
9 market sectors, and trying to gain momentum and market
10 demand for that.

11 And it's also -- it's also helped drive the 2010
12 to 2012 IOU programs.

13 The strategic plan has a bunch of different
14 sectors. I think everyone's pretty familiar but it
15 goes -- you know, it has chapters on residential,
16 commercial, and then it has lots of cross-cutting
17 sectors, sections such as HVAC, lighting, codes and
18 standards, emerging technologies, and such.

19 Next slide. So, in the strategic plan, this is a
20 basic cut and paste, this is what we -- this is the
21 definition that we have adopted via decision, and this is
22 what's in the strategic plan, currently.

23 Basically, the definition we have on zero net
24 energy is that the amount of energy provided on site by
25 renewable energy sources is equal to the amount of energy

1 used by a building annualized over a year.

2 And so I'm not going to get into detail on the
3 definition, and I know Jon McHugh will be talking about
4 that after me. But this is basically the definition we
5 have and there's been lots of kind of talk and wanting to
6 dig deeper into this definition, and make it a little bit
7 more clear so people can get their head around it and
8 actually move forward. So, you know, we'll look forward
9 to that presentation next. But this is what we currently
10 go by and what we have in the plan.

11 The next slide. The strategic plan has four big,
12 bold goals. I'm not going to read them, you can see them
13 up on the slide. But today I'm going to be focusing on
14 the second one, on the bottom left corner, that says "all
15 new commercial construction in California will be zero
16 net energy by 2030."

17 These goals were chosen because of their
18 potential impact on the market on deep energy savings,
19 and their easy comprehension and ability to galvanize
20 market players.

21 The next slide. This matrix kind of is a
22 snapshot from the strategic plan and this is the new
23 construction goal that we have for D&E commercial
24 buildings. And, basically, it helps us -- it lays out
25 how we get to our action plan later on in this

1 presentation. But we've got strategies on the left-hand
2 side that talk about these are what we need to be doing,
3 these are the focus of how we're supposed to get to zero
4 net energy that were in the -- that's in the strategic
5 plan.

6 Then we've got our near-term milestones, mid-
7 term, long-term and further out. And we really focused
8 on these near-term milestones for purposes of the action
9 plan, what we need to achieve to kind of get to zero in
10 the short term, what are some of the preliminary
11 activities that we need to be focused on.

12 The next slide and then, again, the next slide.
13 So, now I'm going to give just a quick snapshot of
14 strategic plan program implementation.

15 We've got our savings by design, the investor-
16 owned facilities, this is their new construction program
17 for commercial buildings. This is a quick, brief
18 overview of the money that's going towards this program
19 and the savings.

20 And then we also have a lot of innovative D&E
21 pilots.

22 So, the strategic plan sets forth these D&E goals
23 and, like I said earlier in the presentation, that
24 vision, that road map, the utilities use that road map to
25 kind of align and come up with some innovative programs

1 for this upcoming -- for this current, actually, program
2 cycle, 2010 through 2012. I know Peter will be talking
3 about the PG&E pilot.

4 The next slide, please. This is a quick
5 breakdown of some of the, then, investor-owned utility
6 zero net energy programs. So, you've got the PG&E ZNE
7 pilot that's doing technical assistance and design
8 assistance, best practices, demonstration projects.

9 SCE, at some of the facilities, they have the
10 sustainable communities new construction program, there's
11 about \$10 million there, and they're doing some master
12 planned communities.

13 And then SCE has the ZNE technology centers that
14 they're trying to integrate different demand response,
15 plug meter, building envelope and plug load technologies
16 to see how they interact, so that's also going on.

17 The next slide and then, again, next slide. So,
18 now I'm going to be talking about the Zero Net Energy
19 Action Plan that we put together. And, basically, it's
20 taking the strategic plan that was updated in January
21 2011 and it's kind of building that out. It's taking a
22 policy-focused document that sets forth leadership and
23 vision and kind of operationalizing that into a -- into
24 an action plan that's going to take those goals and try
25 to build them out a little bit further.

1 So, over the years -- over 2009 and 2010 we had a
2 bunch of workshops at the Commission and we built this
3 out. We got lots of stakeholders together to talk about
4 some of the key strategies and figure out what kind of
5 activities we needed, which ones were most important to
6 focus on, first, and what time frame we should have
7 those -- what time frame we can associate with those.

8 The next slide, please. So, for the commercial
9 chapter there's two main goals. We've got a hundred
10 percent new commercial buildings are ZNE by 2030 and then
11 we have a second goal, which I'm not going to talk about
12 today, which is 50 percent of existing buildings reach
13 zero net energy by 2030.

14 So again, today we're just going to be talking
15 about goal one, which is pretty challenging in and of
16 itself.

17 The next slide, please. So, the goal, the
18 strategy, the thin gold one, I'm not going to read them,
19 but we're going to be talking -- I'm going to be talking
20 in depth about the first three. The first three are we
21 built out in great detail in the action plan and then the
22 last three are ones that we recently launched at a ZNE
23 meeting on June 15th, at the PPUC, and we are trying to
24 build them out and kind of find champions, and I'll
25 describe this later, and find out what kind of activities

1 we need to do to achieve those strategies. So, right now
2 I'm just going to be talking about the first three.

3 The next slide. So, this slide just kind of
4 again gives you a visualization of what I showed earlier,
5 that matrix, that strategic plan and what we did, we just
6 took that strategy. And then in the next couple of
7 slides you're going to see the different milestones, and
8 champions, and actions.

9 So this is what we did, we took those strategies
10 that I showed you earlier and then we just broke them
11 down and we found people that are -- we found champions
12 which are people who are actively working on these areas,
13 these issues in their everyday kind of working life, and
14 helping contribute, and give us input and insight on how
15 we should be achieving these, and then we came up with
16 actions and, again, timelines.

17 The next slide, please. All right, so this is
18 one of our strategies. Strategy 1.1, establish a
19 progressive path to energy codes. Energy codes, as
20 everyone knows there, they're a key policy strategy to
21 reach ZNE building.

22 I can't stress this enough, the market
23 penetration that can be achieved by codes is significant.
24 and so this strategy and milestone kind of talks a lot
25 about REACH codes, it talks about Cal Green, it talks --

1 you know, it's basically we have this as a strategy
2 because it's critical to address this early and future
3 codes -- think about future codes now, given the time-
4 sensitive process of the updates for codes and standards,
5 and having energy codes be such a significant driver,
6 this is something that we want to stress in the action
7 plan.

8 And as you can see, these are the champions that
9 we have associated with the different milestones up on
10 the slide and some of the actions that we have. And a
11 lot of this stuff with codes is definitely ongoing, and
12 so we kind of portray that within the action slide.

13 The next slide is just a progress indicator. We
14 have this throughout the action plan. This kind of shows
15 how we're doing on progress and this, again, is for the
16 2010-2012 period and so we kind of take the number of
17 actions that we have for each strategy and then we divide
18 it by the number of actions that have been completed, and
19 that's how we come up with these arrows.

20 And it's a simple calculation just to quickly
21 help us update and check up on progress.

22 The next slide, please. So, the next strategy
23 I'm going to talk about is expanding Title 20 and 24 to
24 address all significant energy end uses.

25 This one is also extremely important to help us

1 get to zero. There's a lot of non-regulated energy loads
2 in buildings and those definitely pose a threat to zero
3 net energy goals.

4 Plug loads kind of account for about 25 percent
5 of overall energy building use and even more depending on
6 the type of buildings that we're looking at.

7 So, expanding the scope of certain codes can have
8 a great impact. You know, some things to date, the CPUC
9 has done a fantastic job with energy efficiency,
10 television standards, PIER and emerging technology
11 studies and, also, battery charger standards.

12 So, these are -- these are definitely critical
13 strategies for helping us get to zero net energy.

14 There's another one that I couldn't fit on this
15 slide, it's 1-2-3, which talks about lighting.

16 Next slide, please, which is just basically
17 showing that this is an ongoing process and so
18 everything's kind of assigned a certain amount of ongoing
19 percentage. And so since these are all just ongoing,
20 basically, these arrows slowly move as the code updates,
21 slowly progress, and the workshop process occurs and the
22 update process happens.

23 So, these are just slowly kind of chugging along
24 until the codes are actually updated and then this will
25 probably start all over again with the new code cycle.

1 The next slide, please. Again, this is showing,
2 again, how plug loads are extremely important to
3 incorporate and the action plan is definitely focusing on
4 that. That was something that we heard at a lot of our
5 workshops was plug loads, all right, we need to be
6 focused on plug loads, and this slide kind of illustrates
7 that.

8 And the next slide, again, talks about zero net
9 energy and plug loads, and how it's extremely important
10 for the commercial sector to be focused on this.

11 And we have another strategy with the building
12 goal that focuses on plug loads, as well.

13 The next slide. And, lastly, I'm going to talk
14 about the select strategy, which is establish the path to
15 zero campaign to create demand for high-efficiency
16 building.

17 So, with this strategy we've got -- we've got
18 some actual people that are building zero net energy
19 communities. We've got beta communities as a champion,
20 and they're kind of focused on identifying ZNE key
21 audiences, they're putting together outreach and
22 education material, really trying to get a fact sheet
23 together and education what, exactly, is zero net energy.
24 A lot of people aren't -- don't know what this is.

25 And so this strategy's focused on kind of

1 building demand and education and awareness.

2 And then the second strategy milestone within the
3 strategy really focuses on organizing forums and we have
4 the utilities that are actively working on this,
5 education, zero net energy and so forth.

6 The next slide, please, which is again how we're
7 doing on the strategy.

8 And then the next slide, again, which is overall
9 action plan progress. So, to date we're definitely
10 falling a little bit behind, but this is only kind of
11 taking into consideration the active strategies that we
12 were working on. There was a whole bunch of strategies
13 that we just didn't even get to in the year 2010, and so
14 incorporating more strategies and actually trying to, you
15 know, build on our learning curve here of implementing
16 the action plan, and I do expect to see more progress in
17 the next year.

18 But there is definitely a lot of moving parts and
19 we're definitely in the early stages of trying to get to
20 ZNE. It's still kind of in the mason stage which we're
21 trying to build demand for at this moment.

22 Next slide. These are some of the people that
23 are involved with the action plan and, hopefully, in the
24 next year we'll have even more people involved with this
25 action plan as we build on it.

1 The next slide and last slide. So, just to kind
2 of close, these are some of the key drivers that I see
3 for zero net energy for new construction. We have -- we
4 know we need to have aggressive codes, such as Cal Green
5 and REACH codes. Smart meter and demand response
6 devices, trying to incorporate these into the codes and
7 they could have a great influence on energy end use.
8 Demonstration projects and design contests, you know, are
9 definitely going to help build demand and show people
10 what these zero net energy buildings look like.

11 And, of course, innovative financing tools and
12 integrated design development is extremely important for
13 new construction.

14 And the last slide, that's it. And the next
15 slide is just Q&A, which I don't know if we'll be doing
16 that at the very end, and then my contact information on
17 the slide following.

18 So, thank you very much.

19 MS. BROOK: Great. Thank you so much, Jordana.
20 So, we will hold questions until all of our presenters
21 have gone through their talks and we appreciate you
22 staying online and being part of our day today.

23 MS. CAMARATA: Absolutely.

24 MS. BROOK: So, next up we have -- first, I'm
25 going to get to Jon's slides and then I'll introduce him.

1 All right, so next up we have -- oh, and Jon just
2 you can either come up here and talk, or there is a
3 wireless mouse if you want to sit. Last time I saw it,
4 it was by Steve. It's completely up to you.

5 MR. MC HUGH: Maybe, I'll just --

6 MS. BROOK: All right. So, let me introduce Jon
7 McHugh to you. He's a registered mechanical engineer and
8 he's the principal of McHugh Energy Consultants.

9 He started in the energy field 30 years ago in
10 selling solar water heating systems. To pay his way
11 through graduate school, Jon conducted over 100
12 industrial energy assessments and ultimately was he
13 Assistant Director of the Department of Energy sponsored
14 Colorado State University Industrial Assessment Center.

15 Jon has helped developed or upgrade energy codes
16 for Colorado, Canada, ASHRAE 90.1 and California's Title
17 24.

18 Jon's recent projects include strategic planning
19 for the California Statewide Codes and Standards Program
20 and for the Energy Foundation, the Strategic Plan for Net
21 Zero Homes by 2020.

22 Thanks Jon.

23 MR. MC HUGH: Good morning. So, I thought that
24 I'd start off with sort of the rationale behind ZNE
25 homes. And I'm sure many of you have seen pictures

1 similar to this where, you know, we've definitely changed
2 the global environment, whether it's the amount of light
3 at night, the amount of carbon in the air, and also the
4 amount of atmospheric ozone and the amount of ultraviolet
5 radiation we see at, you know, at the terrestrial level.

6 The thing that's interesting about this is that,
7 you know, if you look at all of these things you see
8 that, you know, the next shoe's going to drop, you know,
9 the series of bad news, et cetera.

10 However, you know, we have in the past responded
11 to challenges and, actually, if you look at the results
12 of the Montreal protocol, we've actually sort of already
13 hit bottom in terms of depletion of ozone and the
14 replacement of various, primarily, refrigerants and a
15 number of other activities that we've done. We've
16 actually started to sort of bend the curve, so to speak,
17 in terms of ozone.

18 And, you know, we're looking at trying to do some
19 of the same sort of things with carbon and some other
20 issues in the State.

21 But carbon is not the only issue and there's
22 some, you know, no-regrets responses to try to reduce
23 energy consumption and carbon emissions.

24 You know, we might think of California as a green
25 state, but our air certainly isn't. And, you know, we

1 have essentially the worst air quality in the United
2 States.

3 So, there's additional health, financial benefits
4 associated with these kinds of efforts in terms of energy
5 efficiency.

6 Now, you know, we're all here to talk about zero
7 net -- or at least I'm here to talk about zero net
8 energy. And part of that is, you know, what a powerful
9 concept it is. It's very simple to understand. You
10 know, what's hard to understand about zero?

11 And it has reset sort of people's expectations
12 about what we can do in terms of energy consumption and,
13 also, in terms of net energy consumption in buildings.
14 And pretty much, you know, every country throughout the
15 world has got some kind of conference on zero net energy.

16 ASHRAE, which is the primary organization that I
17 participate in quite a bit, the American Society of
18 Heating, Refrigerating and Air Conditioning Engineers.
19 There's been a number of different publications,
20 conferences and there's all sorts of work occurring on a
21 variety of different levels.

22 And all of them has sort of reset sort of -- you
23 know, I mean just 10 or 15 years ago we were talking
24 about incrementally, you know, impacting energy
25 efficiency by 10 or 15 percent.

1 And now we're regularly talking about -- you
2 know, ASHRAE 90.1 had a 30 percent goal that they're
3 close to achieving. The standard design, sort of high-
4 performance building standards are focusing, looking at
5 20 percent reductions from, basically, the turn of the
6 century, you know, 2000. So, in a fairly short amount of
7 time we're looking at really turning on its head what
8 our, I'd say, prior sort of psychological barriers to
9 going deeper than we have in the past.

10 And, of course, this has an impact on the global
11 environment, but it also just -- you know, just like the
12 comment about all politics is local, well, the sort of
13 effect that we're talking about is something that's on an
14 individual basis. It gives people a sense of empowerment
15 in terms of their energy consumption and that they're
16 contributing.

17 And, you know, today I'm going to talk about
18 primarily what is this definition of zero. So, you'll
19 ultimately, I envision at least for homes, that we're
20 looking at something that helps us define what is zero on
21 our own energy rating system.

22 And, you know, so there's -- we want to have a
23 message that is simple to understand for the general
24 public in terms of, you know, what does zero mean and at
25 the same time have all the policy decisions because

1 there's lots of -- you know, it's not just carbon,
2 there's other things. There's air emissions, there's
3 water, there's a bunch of other things that impact the
4 State and we can't just think about a single metric when
5 we're talking about underneath the hood, of this
6 particular rating system that ultimately defines what is
7 zero net energy.

8 Now, the question is, as you've probably heard
9 that there's a number of people that are, you know,
10 concerned about global warming, and zero net energy and
11 these various things are seen as sort of, you know, the
12 opportunity for the State to shake down the general
13 public.

14 And I think the issue here is that there's a
15 number of different things that we can do on a statewide
16 basis that actually increases the wealth of all of our
17 inhabitants.

18 And I don't know if -- I'm sure most of the
19 people in the room have probably seen these supply curves
20 for carbon abatement, but just for those folks that may
21 have never seen it before, unlikely, I know, on the Y
22 axis here is the cost of abating the particular amount --
23 per ton of carbon, how much does it cost to abate the
24 amount of carbon emissions?

25 And this scale is actually positive and negative.

1 So, we would normally think, oh, it's going to cost
2 something to save something. Well, in fact if you look
3 at the lifecycle cost which is saying, okay, I'm reducing
4 my energy consumption. It costs me a certain amount of
5 money but if I, essentially, look at the present value of
6 borrowing the money to make the change and looking at the
7 cost savings, there's a number of different things that
8 are over on the left side of this curve here where it's
9 all negative. And these are primarily things associated
10 with energy efficiency.

11 And, you know, you think, hey, this is sort of
12 the no-brainer thing. This is the no-regrets activity.

13 But the fact of the matter is, is we are actually
14 in a situation where we have not captured that area
15 that's shown in green on the plot. In fact we're in a
16 situation where there's a lot of reasons why the State
17 has not fully embraced the issues of fully optimizing or
18 all the wealth generation that's associated with reducing
19 energy consumption on a number of levels.

20 And then, of course, if we actually are looking
21 at the -- fully, you know, hitting some of these targets,
22 there's probably going to be some net expense to society.
23 And the question is these are net expenses that are net
24 of extranalities that don't include things like health
25 effects and, you know, the overall effects of

1 environmental degradation.

2 So, this is just looking at a financial basis.

3 And so, you know, the first steps as we look at -- and
4 this is all, you know, very consistent with the CPUC
5 loading order and the Energy Commission loading order,
6 first looking at all those things that are cost effective
7 and let's try to reduce, basically, the money that's
8 essentially flushed down the toilet every day where we're
9 not optimizing our efficiency of our buildings or the
10 rest of our environment.

11 So, I'm going to talk a little bit about, now,
12 the discussion that we had with our working group on the
13 ZNE definition. And California Public Utilities
14 Commission, when they first defined this a couple of
15 years ago, they started off with a vision, which is
16 great. But now, as you try to develop an implementation
17 plan you actually have to say, okay, now the rubber hits
18 the road, what do you really mean?

19 And so the language here, that I have posted, is
20 the language extracted from the Big, Bold Energy
21 Efficiency Strategy. You know, the primary one's about
22 all new residential construction being zero net energy by
23 2020, commercial by 2030.

24 And then the definition that says the amount of
25 energy provided by on-site renewable energy sources is

1 equal to the amount of energy used by the building. And
2 it also indicates that ZNE may also include embodied
3 energy.

4 So, the results of this, we've spent the last six
5 months -- you might think, six months to describe ZNE?
6 Well, you know, you get a bunch of people in the room and
7 this has, you know, a huge impact on policy of the State
8 so, not surprisingly, there's a lot of very intelligent
9 people, with a lot of different perspectives, and we're
10 trying to develop a consensus.

11 And from that work we developed a memo. And I
12 just have to note that we all didn't agree. So, there
13 was a memo and then we're looking at adding onto that,
14 basically, you know, the loyal opposition's various
15 statements about, you know, other people's definitions of
16 ZNE.

17 So, these are some of the questions that we've
18 tried to address. Probably many of you have thought
19 about these in the past. You know, what -- how do we
20 define energy? Do we define it in terms of site energy,
21 which is the amount of energy, you know, that passes
22 through the meter?

23 Do we use source energy, which accounts for the
24 amount of energy used back at the power plant?

25 Do we use other definitions that might include

1 societal costs of energy?

2 And then, when we look at zero net energy, what
3 is the energy that we're talking about? Is it just the
4 energy required to operate the building?

5 Is it the energy that we normally regulate in
6 Title 24?

7 Does it include the energy that's in our
8 materials, the energy that's required to get back and
9 forth to the building?

10 And then we talk about on-site renewable energy;
11 what does that include? Does it include photovoltaics?

12 If I -- can I use biomass, can I receive --
13 basically, can I have a pellet stove and have pellets
14 sent to me just as long as they're sustainably harvested
15 I can start heating my building with wood. So, those are
16 some of the questions.

17 And then, finally, you know, what is on site?
18 So, is that just the building, itself, is it the
19 development?

20 What if I'm a large landowner and I own 20
21 properties and I stick all of my renewables over on one
22 property, can I now then not put any renewables on the
23 other 19?

24 So, those are some of the kinds of questions that
25 we wanted to address.

1 One of the things we did was that we wanted to
2 have a simple definition, but also have the richness of
3 all the policy decisions that are underneath that fairly
4 simple and straight forward definition.

5 And I want to acknowledge, you know, Rick Diamond
6 because I think he fairly much kind of came up with this
7 idea.

8 So, we have this simple definition and then we
9 have sort of the footnotes and the italicized words, et
10 cetera, that then, you know, the terms, themselves, are
11 defined. So, anyway, that's what we want to do there.

12 So, the first thing that we recognized was that
13 everyone can think about a reason why you can't have a
14 zero net energy building in some place.

15 So, I've got the house that's in the -- I want to
16 build this house and it's in a 300-year-old redwood
17 grove. Am I going to cut down all the trees so I can be
18 zero net energy? No, probably not going to do that.

19 We're not going to have that as a State
20 requirement, you know, leave no tree, what, standing or
21 something like that.

22 So, yeah, exactly. So, what this does is it
23 recasts those goals and says that all new construction is
24 ZNE or equivalent to zero net energy by 2020.

25 And the reason to do that is to uncouple those --

1 those buildings that would be touted as a genuine ZNE
2 building, that it actually is producing its total amount
3 of operational energy on site. So that if you started
4 trying to water down what the definition of ZNE was to
5 hit the policy goal, then you don't actually have a term
6 that's useful for marketing ZNE buildings, you know, that
7 we certainly want to encourage.

8 Because those buildings are essentially, just
9 like we use race cars to develop new technologies for
10 passenger vehicles, I see the same thing occurring with
11 zero net energy buildings, that these buildings -- not
12 every building in the future is necessarily going to be
13 zero net energy, but the technologies that are in those,
14 you know, purely zero net energy buildings are then going
15 to diffuse into the rest of the building stock.

16 So, this was, I think, a pretty big deal to
17 actually revise that goal. And, of course, this is up to
18 the Public Utilities Commission to think about whether or
19 not they want to, you know, take this recommendation.

20 But then it frees up then, isolating, you know,
21 what is now zero net energy versus some policy questions
22 that would be embodied in codes, and programs, and other
23 things in terms of zero net energy equivalent.

24 And it should be noted that equivalency was sort
25 of in the original goal and that for the existing

1 buildings it says that 50 percent of the buildings will
2 be equivalent to zero net energy.

3 So we think that, perhaps, that was the intent,
4 initially, anyway.

5 And then in terms of the definition of zero net
6 energy, what we're proposing is -- or at least this
7 memo's proposing is that the societal value is the
8 definition of energy. The societal value of energy
9 consumed by the building is less or equal to, then, the
10 societal value of the on-site renewable energy generated.

11 And the reason for using societal value of
12 energy, and I'm going to go into more detail, but the
13 issue is that this captures a number of prior decisions
14 around energy policy in the State, and I'm going to go
15 into more detail about that.

16 So, the societal value of -- so, I guess I won't
17 read these, but we'll get into definitions of societal
18 value which, historically, we've also known as TDV, or
19 time dependent valuation of energy.

20 In terms of the site, that the site is the
21 property receiving development entitlements and building
22 code permits, because we expect that over the long term
23 that this would ultimately be enforced through the
24 Building Code, so you need some kind of mechanism of
25 defining what that property is.

1 And also that, you know, again, the purpose of
2 zero net energy is this paragon or example of,
3 essentially, a building that can "live within its means,"
4 that it's able to generate as much energy as it needs and
5 that that -- actually, I think it's pretty eye-opening
6 that it's actually possible to live within your means,
7 that we're not just, you know, developing new building
8 stock that ultimately is extractive and requires constant
9 input.

10 And then, also, what is renewable resources, we
11 talked a little bit about that earlier.

12 So then, you know, some of the other questions
13 was what sort of -- what is the basis of ZNE? Does it
14 include embodied energy? Does it include transportation
15 energy? Does it include water energy and all these kinds
16 of things?

17 At this point of time we're just talking about
18 the basis being on the energy usage of the building. And
19 the reason for this is that we feel it's an attainable
20 goal, it's easily understandable.

21 I think when people normally say a zero net
22 energy building, they're not thinking of, oh, I've got a
23 building that's actually providing more energy than I
24 need to meet my ongoing needs, it actually, also, sort of
25 paying into the energy bank for the amount of energy that

1 was used in the concrete, and the foundation, or
2 something like that.

3 So, it's readily understandable to, I think,
4 someone's basic understanding of what ZNE means.

5 Also that the building usage includes plug loads.
6 So when we think of a zero net energy building, or at
7 least when I think of a zero net energy building that the
8 amount of renewable generation's not just serving the
9 heating, ventilating, and air conditioning, but that it's
10 also serving all of the uses that are in that building,
11 and so that would include plug loads.

12 And that has a huge policy impact because over
13 half of the electricity loads in homes are not -- are not
14 your Title 24 regulated end uses, they're -- they're
15 essentially plug loads, and it highlights the importance
16 of appliance standards and other things that we do in
17 terms of improving plug load efficiency.

18 So, this also has an implication in terms of our
19 rating tools. So for instance the HERS-2, which is the
20 Home Energy Rating System, accounts for plug loads in
21 that rating, and as we move forward into commercial
22 buildings, we'll probably want to make sure that we're
23 fully accounting for all of the plug loads in those
24 buildings.

25 And in some cases you have to make some

1 assumptions about what is a typical plug load when you
2 don't have that information.

3 And I've listed COMNET here, which is a national
4 group that's working on these kinds of issues.

5 So then what is ZNE equivalent and because,
6 potentially, that's sort of half of this new policy
7 statement which is all buildings are either ZNE or ZNE
8 equivalent.

9 So, you know, what is proposed is that it's a
10 property that achieves, it's a societal value of energy
11 equivalent for those ZNE buildings. And then that opens
12 the door for all of the policy decisions that have to,
13 you know, go through a public process and decide what
14 sort of tradeoffs do we allow between other factors and
15 energy and that potentially has -- you know, does have
16 those other issues associated with energy, whether it's
17 embedded energy, transportation energy, embedded energy
18 in water and those sorts of things.

19 And so this actually builds on the precedence
20 that's actually already in Title 24, where we have a
21 series of prescriptive standards, essentially a cookbook.

22 And in our case, for ZNE, the cookbook is that
23 the building doesn't use more societal cost of energy
24 than the amount of energy that it's producing.

25 And in the Title 24 Energy Code we have these

1 prescriptive buildings that, you know, say you've got
2 this kind of glass and this kind of insulation in the
3 building, but the builder has all the flexibility of
4 trading off as long as they run it through the
5 performance approach and it ends up with the same
6 energy -- or, actually, the same societal cost of energy
7 because Title 24 uses what we call PDV energy, so use the
8 same societal cost of energy as that base building.

9 So, again, it builds on sort of the existing
10 structures that are already in place.

11 So, I'm going to talk a little bit about, now,
12 some of the discussions that we had within our group. It
13 looks like I've got about five more minutes. And so some
14 of these issues that I've talked about earlier, and we've
15 seen the Big, Bold Strategies, and it's worth noting that
16 two of these refer to ZNE.

17 Again, this was the definition that was talked
18 about earlier.

19 And then, you know, what is net zero? Again,
20 we've talked about that basically the amount of
21 renewables out as the same societal cost as the total sum
22 of the other energy sources in.

23 And so there are various metrics, we've talked
24 about the site and source, et cetera, and societal cost.
25 Here's some other ones, grid neutral, carbon neutral.

1 And then what do we include in terms of our
2 definitions? So, one exercises we went through was sort
3 of a pro and a cons of the various definitions. And one
4 of the definitions, you know, that there was some support
5 for had to do with site energy. And the pros associated
6 with site energy is, well, there is a definition of just
7 exactly how much, you know, energy is metered when we
8 sell it to the consumer and, you know, so it's metered,
9 it has a value, et cetera, you can make conversions.

10 It's a more stringent view of zero net energy
11 because essentially the value, when you look at source
12 energy and some of these other definitions, the value of
13 electricity is a lot higher and so that exported
14 renewable electricity would have a lower value under this
15 definition. And, also, the value of gas would be
16 considered, essentially, relatively higher as a result.

17 And also that the CPUC, you know, has goals that
18 are associated with kilowatts, kilowatt hours and therms.
19 Actually, that goal is for kilowatts, which really aren't
20 covered in this definition, but in terms of kilowatt
21 hours and therms, those are captured.

22 In terms of the cons, you know, the United States
23 is one of the few countries, you know, that uses English
24 units. The English don't use English units. And so we
25 actually don't use the same units for electricity and gas

1 and so it's not actually -- it's not really that simple
2 for the consumer. You know, okay, I've got to divide by
3 3413, multiply by a hundred thousand, they convert it
4 into therms or kilowatt hours, et cetera.

5 So, the simplicity of site energy when you start
6 doing tradeoffs isn't quite as simple in America as it
7 might be in Europe or something.

8 It's harder and more costly to achieve the goal,
9 it would cost 60 percent more -- and I'll show some --
10 I've got some backup slides, but it would -- you'd be
11 paying 60 percent more for your renewable system and so
12 it basically sets the bar, it makes it more stringent,
13 and so it would add substantially to the statewide cost
14 and for individuals to achieve this.

15 It treats all fuels identically so even though
16 propane, on average, costs about twice as much as natural
17 gas this would treat that those two fuels are treated
18 identically. So, not a great, you know, in terms of what
19 does the consumer care about? Do they really care about
20 therms and kilowatt hours or are they actually more
21 interested in dollars. And so site energy doesn't
22 necessarily create that tradeoff.

23 It ignores the concept of thermodynamic quality,
24 which is that it took a lot more energy to make each one
25 of those kilowatt hours than it does for -- to make 3,000

1 BTUs of natural gas. You know, the reality is that since
2 it does have a higher quality if you treat it -- if you
3 treat those different energy sources identically, it
4 creates some distortions, including things like, you
5 know, potentially using electric resistance for water
6 heating, which I don't think the State -- you know, we've
7 done some things where the State doesn't really want to
8 follow that policy choice.

9 And also it doesn't address peak demand. And, of
10 course, we've got lots of load management policy goals
11 that we're trying to achieve. And so -- so, anyway,
12 those are some of the cons associated with site energy.

13 So, source energy, that's looking at essentially
14 how much energy back at the power plant is consumed in
15 terms of looking at tradeoffs and valuing, you know, to
16 make those tradeoffs between renewable energy, the
17 various sources that are used on site.

18 And the pros are that there's other definitions
19 of ZNE that the European Union uses, source energy, the
20 DOE uses source energy. It values energy based on
21 primary energy. You know, there's some kind of weird
22 things when you think about it in terms of hydro.

23 I've got one minute, okay.

24 And encourages fuel -- so, anyway, there's pros
25 associated with it.

1 But the cons are that the source multipliers are
2 actually not consistent, so it's not really that
3 appropriate or consistent across the world. It can be
4 complex or it can be simplified. Again, it treats
5 propane and natural gas the same even though they have
6 different costs. It doesn't address peak demand.

7 And the -- for societal cost, the pros of using
8 societal cost is that it has sort of the benefits of
9 source energy, plus it's compatible with what we already
10 are using for Title 24. And one of the reasons we're
11 using it for Title 24 is that it addresses peak demand.
12 It's compatible with the other rating systems that we
13 already have in place, the HERS rating, it accounts for
14 the value of different energy sources. It comes closer
15 to the cost of what the consumer actually pays for their
16 energy consumption. And it also is expandable and allows
17 for other policy decisions to be included. And it's
18 actually very similar to how the CPUC evaluates their
19 programs.

20 Actually have a -- for people that are interested
21 later on, I have a slide that describes how, essentially,
22 TDV, if you take off the retail rate add or in the
23 emissions value that's essentially -- the rest of that
24 evaluation is the same as what's used for the avoided
25 cost of energy that's used for evaluations of efficiency

1 programs.

2 Now, the cons are that historically we've been
3 using the term "time dependent valuation" and then that
4 leads into sort of grabs how time -- you know, how costs
5 vary by hour, et cetera.

6 But, you know, that's really the mechanics of the
7 details of the thing. It's really easier to explain this
8 as a societal cost because that's really what we're
9 getting after with TDV. It is complex to calculate
10 because it is on an hourly basis.

11 You know, as I've showed kind of on my second
12 slide, I showed sort of the HERS rating and zero, all
13 these details are kind of under the hood of the
14 calculation engine but, you know, it does make it harder
15 to calculate. And for billing analyses, you know, you
16 need some kind of -- it also makes it more complex.

17 And another issue that was brought up is, well,
18 it's not purely energy because demand costs are really
19 talking about the capital costs of equipment, you know,
20 the power lines and all these various other things, all
21 the infrastructure that's required to meet those loads.

22 And I know that I've run out of time so I guess
23 I'll stop here but, hopefully, this will lead for some
24 interesting discussions this afternoon. Thank you.

25 MS. BROOK: Okay. That was very, I think,

1 comprehensive and lots of things to chew on later.

2 Let's get to our next speaker. Okay, so now
3 we're going to have two different speakers talk about the
4 pilot programs that are happening in the State for zero
5 net energy and our first speaker is Jeff Gleeson.

6 So, let me introduce Jeff. Jeff is currently the
7 manager of PG&E's Core Buildings Products Team in the
8 Customer Energy Solutions Organization of Pacific Gas &
9 Electricity.

10 The Buildings Team focuses on the Zero Net Energy
11 Pilot Program, Energy Upgrade California, which we'll
12 hear about later this afternoon, and fenestration
13 products.

14 Prior to joining PG&E, Jeff received his MBA from
15 UC Davis, where he was an emerging venture analyst for
16 the Energy Efficiency Center on campus. Jeff's research
17 at Davis focused on thermal storage and lifecycle cost
18 modeling.

19 Jeff has a bachelor of science in civil
20 engineering from Cal Poly and he worked as a design
21 engineer prior to attending UC Davis.

22 Thanks Jeff.

23 MR. GLEESON: Great. So, thank you for having me
24 today. It's good to be here not only because this is my
25 home town but, also, because as Martha mentioned -- thank

1 you. Hopefully, everybody can hear me all right.

2 As Martha mentioned, my group covers ZNE, which
3 is a non-resource program, meaning for the utility it
4 doesn't have direct energy savings right now, but I'll
5 get into why it's going to have plenty of savings later.

6 But, also, the Energy Upgrade California Program,
7 which is otherwise known as "Whole House" in some
8 circles, depending on where you run in the energy
9 efficiency space.

10 So, I'm actually going to have to run after this
11 presentation to go talk to some folks about Energy
12 Upgrade California.

13 So it's good to be here today to talk about sort
14 of the steps that we're going to take towards those 2020,
15 2030 goals.

16 So, talked this morning about the end goal and
17 then I'll talk with some folks about more of the near-
18 term retrofit activities and, obviously, we'll cover that
19 this afternoon.

20 So, I will be stepping out for a little bit, but
21 I will be back this afternoon and hope to connect with
22 folks then as there are, I'm sure, questions and some
23 things we can discuss.

24 So really quickly, just some why, what, and
25 specifics of what I'm here to talk about this morning,

1 which is PG&E's Zero Net Energy Pilot Program.

2 And I think it's particularly exciting, even
3 though it doesn't have customer-facing rebates, or
4 incentives, or anything that we typically would talk
5 about in the utility program, a lot of great studies and
6 some different pieces that we're looking at that I think
7 everybody will be interested in.

8 I'll leave the policy discussion, we've certainly
9 heard more about that than I can add right now, so I
10 think I'll move forward.

11 So, what is the objective of our pilot program?
12 It's really the definition up there, but it's three
13 buckets, three buckets of things that we're trying to do.

14 We're trying to get through some project
15 complications for folks who are trying to move their
16 projects out at residential buildings, commercial
17 buildings, or even community-scale designs, which would
18 include educational facilities, things like that. It's
19 trying to take that sort of design or your new projects
20 to ZNE, but don't quite have the resources to get there,
21 we're going to help folks do that.

22 We're also looking at large and small technology
23 assessments. That's a particularly exciting one. Small
24 technology assessments aren't really that small, we just
25 call them that because the larger ones are a bit loftier

1 in scope.

2 But looking at things like a heat pump water
3 heater; what does it take to get e-pump water heater
4 technology to help us on the goal to ZNE or the path to
5 ZNE, and then really comparing it to other technology.
6 So as we look forward down the 2020 or 2030 road and
7 you're thinking about putting something in what are your
8 tradeoffs, what are the technologies that you're going to
9 consider and the pros and cons of each.

10 And the those larger technology assessments that
11 I find even more exciting are asking bigger questions.
12 Examples might include DC wiring in buildings, or
13 district heating in the larger community. Or even one
14 that I find particularly intriguing, that I'd like to
15 talk to folks about later is what does it look like when
16 all of these things work? So, what does it look like
17 when those technologies proliferate and those -- we
18 actually accomplish these goals, because Energy Upgrade
19 California is certainly going to take us part of the way
20 there and so we will.

21 So, what does that look like, how do we really
22 keep the ZNE in sort of a sustainable and fair future?
23 It's a very interesting, it's a larger picture question.

24 And then the third bucket is education. So,
25 hopefully, a few of you were able to attend our ZNE forum

1 a few weeks ago in Berkeley. We're going to have another
2 one next year. If you weren't able to attend, then let
3 me know and we'll get you my contact information.

4 Also, courses at the Pacific Energy Center and
5 the Stockton Training Center; those are free, so really
6 encourage you to take those, if you haven't already.
7 We've got some really, really great instructors for our
8 ZNE series, some great architects, some great minds in
9 the space.

10 So, again, the complications, the tech
11 assessments, and then the education piece.

12 So those are -- the education piece we call "Tell
13 The World."

14 So, a little bit more detail on what we're trying
15 to do. We're going to try to look at five communities
16 between now and the end of our program cycle, which is
17 for the end of 2012. And when we say five communities
18 what we mean is look at five community-scale projects
19 that could potentially get to ZNE and look at how we can
20 help them get there. That might be a large residential
21 development, or maybe an office complex or, as I
22 mentioned, maybe a high school or a community college.

23 Demonstration showcases then would be the
24 buildings that are on smaller scale, so an individual
25 commercial building, or an individual residential

1 building.

2 If you're looking at putting something new up and
3 you need to -- want to get it to ZNE, don't have the
4 resources, that's where we'll hopefully be able to step
5 in. It's a competitive process, I can give you more
6 details if you want, but I won't get into the -- won't
7 get into the details now.

8 And then the breakdown of the technology
9 assessments, we're only going to do five of those large
10 ones, so we really need to pick our discussions wisely.

11 And then design integration, the last thing I
12 didn't mention earlier about the education piece is the
13 design competition. Really, excited to move forward on
14 some of those, we're going to have a design competition
15 this year that you'll be hearing about later, and then a
16 design competition next year for students and
17 professional architects.

18 So, taking a theoretical building, I'm sure some
19 of you have been involved in these in the past, I know I
20 was as a civil engineer and undergrad; taking a look at a
21 site, thinking about what could be put on it -- no
22 real -- not necessarily going to build anything or put up
23 the winning bid, but taking a look at what we could use
24 from a mixed-use perspective, or maybe a larger
25 community-scale, transportation perspective on a site

1 that maybe could use some help. So, we'll have two
2 design competitions and those should be really great
3 events and, hopefully, we're going to see some really
4 great entries in those.

5 So again, no incentives, no flashy marketing
6 materials for this program, but I think asking and then
7 exploring and then, hopefully, beginning to answer some
8 more fun questions of what we've got here that we're
9 talking about today.

10 So again I mentioned, there are some smaller
11 details about some of these things, be happy to follow up
12 with any of you offline, if you've got questions.

13 But competitive process for projects that are
14 looking for design assistance, which is kind of the
15 nature of what we need to do and then we are going to be
16 selecting consultants and then actually move through that
17 public process, as well, to selecting what we'll pair
18 with these projects and hopefully get some assistance for
19 folks that they otherwise wouldn't be able to bring on to
20 their design teams.

21 And then really take a comprehensive look at
22 project scopes and where community or building level
23 projects can hit.

24 So, that's a really quick overview and I know
25 we're a little behind, so I'll stop there. And I'm going

1 to talk about some data for the Residential Program, but
2 I'll be back later this afternoon, happy to talk more.
3 It's a small pilot, but it's an exciting pilot. So,
4 looking forward to talking with you folks later, thank
5 you.

6 MS. BROOK: So, all the hard questions we'll save
7 for this afternoon when Jeff gets back. So, great, thank
8 you Jeff.

9 Our next speaker is Steve Galanter from Southern
10 California Edison, and let me bring up his slides and
11 introduce him real quickly. I know you're in here
12 somewhere. Here you are. Okay.

13 Okay, Steve Galanter manages Southern California
14 Edison's Customer Energy Efficiency and Solar Division's
15 Strategic Planning and Technical Services Group. His
16 responsibilities include the management of long-term
17 energy efficiency strategic planning, development and
18 management of engineering savings estimates for energy
19 efficiency program operations, tracking systems
20 coordination, and he's also responsible for quality
21 assurance for the division.

22 During Steve's 30 years at Edison he's held the
23 positions of Manager of Regulatory Planning, Manager of
24 Technical Support, Manager of Technology Assessment and
25 Application, and Supervisor of Load Management Programs.

1 Steve.

2 MR. GALANTER: That's a great resume, I wish it
3 was mine. Just kidding.

4 So, I have really two slides that I want to go
5 over and the first slide is just seven projects, seven
6 emerging technology and customer energy efficiency, and
7 solar-related ZNE projects that I want to talk about.

8 And then comment a little bit on what John was
9 going over in terms of definitions of ZNE. And those are
10 my two slides.

11 So, the first one, the biggest project that we
12 probably have going on, which is not solely a ZNE
13 project, but it's an integrated project associated with
14 looking at our -- looking at our energy grid and asking
15 the question what is some of this new technology going to
16 do to our energy grid? What kind of affect is it going
17 to have? And included in that is zero net energy homes.

18 So there's four blocks of homes that will be
19 installed as part of what is called the "Irvine Smart
20 Grid Demonstration."

21 Each block of homes is about 10 to 12 homes and
22 they're all going to have a different focus to them. One
23 block of homes will have battery storage or electrical
24 energy storage, because some people don't like the word
25 "battery" for some reason. But those homes will have

1 site-positioned batteries in them.

2 Then roughly about the same number of homes will
3 have a community battery and it will be associated with
4 the transformer for those homes.

5 And then another group of homes will be zero net
6 energy homes. Those are what we're talking about today.

7 And then the last group of homes will be the base
8 case or the comparison group of homes.

9 It's a very big project, it's a lot of money,
10 it's almost \$80 million, half of which is funded by the
11 Department of Energy and the other half the Southern
12 California Edison and some other folks.

13 But as you can guess by the nature of this
14 project, I think I could say safely that the utility
15 industry is concerned about what the future holds in
16 terms of new technology, new developments, photovoltaics,
17 electric vehicles, those kinds of things and what they're
18 going to do to our grid.

19 Our grid has not been that dynamic in the past.
20 It's been a one-way grid. Electrons have flowed out
21 towards businesses and homes, and it's not been a two-way
22 transfer of electricity.

23 That is already changing and it will be changing
24 a lot in the next ten years, and that's the time frame
25 for zero net energy that we're talking about; high

1 concentrations of photovoltaics, inverters, that sort of
2 thing, electric vehicles.

3 So this is a great project, we're leveraging
4 other parts of the company in terms of doing this,
5 because the roughly \$40 million on our side of the
6 funding for this is -- most of it is coming from our grid
7 operations team, it's not coming from energy efficiency
8 but, yet, we're able to leverage that.

9 And so this is a great project and it's just
10 getting underway so, hopefully, we'll get a lot of good
11 information out of it.

12 Now, the next one on the list of seven is this
13 power modeling study. It is a study, it's not actual
14 hardware in the field, but it's an analysis of inverters,
15 inverter technology to go primarily in homes.

16 And just as CFLs, not all CFLs are alike in terms
17 of color quality, in terms of just longevity, and the
18 quality of the bulb, that's true of inverters as well.
19 And some inverters are what we call dirty and what are
20 they going to do, again, to our grid.

21 The anticipation is there will be lots more
22 inverters in place because there will be photovoltaics,
23 and battery storage, and that sort of thing.

24 And then the third project that I've listed here
25 is this is a single-family model home ZNE project. What

1 we're trying to do is solicit three developers to
2 participate in this project, where they would commit to
3 have one of their model homes being a zero net energy
4 home. So, this would be a home, amongst a number of
5 models, and you would hope that they would have
6 progressively better performance in those models, and
7 then the trophy model would be the zero net.

8 So we're, you know, as you can well imagine, with
9 the housing market as it is today, we're struggling a
10 little bit on this. But that is our intent and we are
11 pushing forward on this project.

12 It will focus primarily on climate zones eight,
13 nine and ten. If you're not familiar with Southern
14 California climate zones, but that goes from coastal --
15 well, not coastal, but near coastal to a very hot region.

16 Then the next project and this was good putting
17 it all on one slide, I don't have to go through the -- is
18 what we call the ABC Home Project.

19 And forgive me, but I don't know what ABC stands
20 for, but I do know it's for trade schools, it's for folks
21 who build homes, and training people to build homes.

22 This is actually Southern California Edison
23 funding the education and training of folks to build
24 these homes. And once built, they would actually build a
25 full-scale home, moving that home to the community, maybe

1 having Habitat of Humanity or somebody take it and
2 actually place it and have a family move into it, and
3 then build another home.

4 So, this has just started, but we're pretty
5 excited about this because, as you can guess, this
6 incorporates a number of elements of awareness,
7 knowledge, technology and community involvement. So, we
8 really like this project.

9 The next one is actually a retrofit program.
10 It's big-box retail. And we saw one of the Big, Bold
11 strategies was essentially retrofit, existing homes,
12 existing businesses.

13 And although some big-box retailers have made
14 attempts, at least in new construction, to do zero net,
15 this is to go to the hard one, the real difficult one,
16 and we think we're close to having a commitment for this
17 occurring. And I can't even name who that would be, but
18 it's a big name. And I hope this works out because
19 otherwise I'm pumping you up for no reason. But, anyhow,
20 so that's what that is.

21 And then the next one is a zero net energy lab.
22 This is something that was funded due to our funding
23 request, Southern California Edison's emerging technology
24 funding request. It's in our program implementation
25 plans. It's to build an energy technology center, really

1 focusing in on zero net energy, that's what it is.

2 We have a refrigeration technology center, we
3 have a lighting technology center, and this would be a
4 center for that, and it would be a center for integrating
5 a number of technologies into the concept of ZNE. How do
6 they work together, how can we optimize that, that's what
7 this activity is.

8 And then the last, which I know Greg is very
9 proud of this because I -- having worked at the Edison
10 Company for so many years, one of our biggest
11 bureaucracies is our IT department and it is really
12 difficult to do this, is to put a blog together from a
13 large company like us, and we did it in short order. And
14 from what Greg tells me, there's lots of interest in
15 this. We're posting articles. The idea, again, is to
16 communicate about ZNE and have a forum to do that and
17 this is our blog.

18 So, now let me just -- let me just comment very
19 briefly and then I'll conclude my remarks, about this
20 definitional discussion that we had. Jon talked about
21 it. And thank you, Jon, for at least recognizing that
22 there isn't consensus on that. Everybody has a different
23 opinion on how you define this ZNE.

24 I think where we're coming from is simple is
25 good, and straight forward. We kind of like the CPUC's

1 approach. It's conceptually very easy to understand.

2 Because we're recognizing that to be market
3 sustainable and to really be successful over the long
4 haul the market has to embrace this, and customers have
5 to understand it.

6 So our approach in general is simple is good.
7 So, as a result site energy is what we like. We
8 understand transportation, water, embodied energy and all
9 that but, again, taking the simple track, we would prefer
10 not to embrace that.

11 And then also recognition of ZNE or I should say
12 near ZNE. Not everybody's going to make it and it's
13 okay, but if it's a fractional ZNE, maybe that's okay,
14 too, again, leading to market -- a potential market
15 transformation.

16 And then also recognition that not all power is
17 equal. Power is made up of a combination of different
18 generation resources from hydro, to nuclear, to coal, and
19 a lot of renewables. California's done a long way in the
20 area of renewables. That shouldn't be ignored in terms
21 of assessing ZNE.

22 Then the last thing I'd like to say is sort of a
23 look back to the seven projects that I outlined. As you
24 can imagine or as you heard, what the future's going to
25 hold in terms of our grid is a big deal for us. And I'll

1 leave you with just this thought, if you think about zero
2 net energy, or just an average home, ultimately zero net
3 energy, but an average home in our service territory
4 consumes between 6,000 and 6,500 kilowatt hours.

5 An electric vehicle that is driven about 15,000
6 miles a year consumes about 6,000 kilowatt hours.

7 A transformer, for a typical distribution, will
8 serve about seven hours.

9 So, if you put that all together and start to
10 think about what's going to happen in the future in terms
11 of our energy grid, along with all the photovoltaics,
12 which is increment and generation, there's a lot, a lot
13 of interest in what's going to be happening in the next
14 10 to 20 years.

15 And that's kind of what's kind of painted my
16 comments and I'll just sort of leave you with that
17 thought. But there's no doubt that the future will be
18 very different than today and it will include ZNE, and
19 photovoltaics, and electric vehicles, and we want to make
20 it work for our company and that's what we're doing,
21 that's what we're working on.

22 MS. BROOK: Thank you.

23 Okay, our final speaker for this morning is Cathy
24 Chappell and she's going to talk about ZNE standards.

25 Cathy is a registered mechanical engineer and

1 Director of Codes and Standards at the Heschong Mahone
2 Group. She's currently leading the development of the
3 California Investor-owned Utility sponsored Code
4 Revisions for the 2013 California Building Energy
5 Standards, which we call Title 24.

6 The project develops specific Title 24 standards
7 language in supporting compliance manual and compliance
8 forms.

9 Ms. Chappell has also assisted the California
10 investor-owned utilities with new construction program
11 development, implementation and evaluation, emphasizing
12 the role of utility programs and priming the market for
13 code updates.

14 Cathy.

15 MS. CHAPPELL: Thanks Martha. Can everybody hear
16 me okay, am I close enough? A little bit up, okay.

17 So, as the last speaker of the session, I also
18 have the duty of kind of giving us some time to speak,
19 have questions from the audience. I, also,
20 optimistically, scheduled another call, as did Jeff,
21 another meeting, so I may need to step out and take a
22 call, but will be around until 11:30.

23 So without further ado, as Martha said, what I'm
24 going to be talking about is the 2013 standards, Title
25 24, primarily the building energy efficiency both --

1 well, I'll get into this shortly, what we're talking
2 about there.

3 And as Jordana covered earlier today, the role,
4 the perspective that I have, as Martha mentioned with the
5 introduction, is what the investor-owned utilities are
6 doing in connection with the Energy Commission on working
7 towards Title 24.

8 And that is part of the long-term strategic plan.
9 One of the critical cross-cutting elements is codes and
10 standards, both for buildings and for appliances. And
11 the CPUC and, therefore, the IOUs are working towards
12 this same ZNE goal that we've been talking about.

13 And I like to present this, I'm not the only one
14 who's done this, as a continuum, when we look at energy
15 efficiency, the role that codes and standards plays in
16 the whole cycle of energy efficiency.

17 And we typically will start or I like to think
18 about starting at the R&D section. What we're looking at
19 is PIER, as a good example, to dive some of the research,
20 looking at some of the emerging technology programs and
21 projects. I think that the ZNE pilot program is a really
22 good example of that.

23 Moving it into the incentive programs, as Jordana
24 mentioned earlier Savings By Design is the utilities'
25 commercial new construction program. There's also the

1 Solar Homes Initiative that the utilities are working on.

2 And all of that feeds into priming the market for
3 codes and standards, and looking at cost-effective and
4 stakeholder-supported code changes that are cost
5 effective.

6 And then, of course, another key piece is the
7 education and training element, particularly as it
8 applies to the Title 24 standards. And that's not a
9 focus of what I'm going to be presenting today, but I
10 just want to emphasize that that is critical to make this
11 all work in the real world.

12 So what we're talking about when we're talking
13 about Title 24 and what we are specifically looking at,
14 we the next round of the Title 24 update, is both the
15 California investor-owned utilities mentioned here, and I
16 will also mention that the municipal utilities, SMUD and
17 LADWP, in particular, have been participating in this
18 activity working closely with the CPUC Title 24 Standards
19 staff to look at base code of Title 24, which is part 6,
20 as well as the REACH standard, which is part 11.

21 And so what we're looking at is trying to achieve
22 significant energy savings for the Title 13, Title 24
23 building energy update that's reasonable, responsible,
24 and cost effective. And this is looking at the TDV value
25 of energy for -- specifically for residential for a 30-

1 year building time frame.

2 And the goals that we're looking at is for -- for
3 Title 24, relative to ZNE, is that Title 24 is really the
4 logical step for ZNE.

5 And as Jordana mentioned, having these
6 requirements in code is -- you know, I think she made
7 some comment about readying the market, but the other way
8 to look at it is it basically forces the market to
9 implement these requirements that we've been
10 investigating and that we think are appropriate.

11 And again, we look at the updates, which is what
12 I'm presenting, we look at implementation, which is the
13 development of the manuals and the supporting
14 documentation of how this works, and the enforcement both
15 at the building department level, as well as with the
16 design community and making these -- the savings actually
17 occur.

18 So, what we're looking at with the Title 24
19 updates is to progressively raise the bar so that towards
20 ZNE what we're looking at or what the Energy Commission
21 has specifically said, for energy efficiency improvements
22 getting about 50 to 70 percent there.

23 And the idea is that there's 20 to 30 percent
24 energy savings for each update cycle as we head towards
25 2020.

1 And this is just a real simplified graphic of
2 what that is. We're referencing it to 2008 so we're at,
3 you know, a hundred percent of the energy consumption.
4 We're looking at here's a step of about 25 percent
5 towards the 2013 or 2014, which is when it's going to be
6 implemented, code. And then stepping down progressively
7 so that by the time we get to 2020 we're below 40 percent
8 and the remainder of that is met with renewables.

9 And so what we're looking at basically here is,
10 again, this is focusing on the residential portion of
11 Title 24, which is the 2020 goal. The non-residential is
12 looking at a 2030 goal.

13 And we have this, what we're referring to as a
14 loading order, where we're basically looking at the
15 building envelope, first, and we're trying to minimize
16 the energy consumption of the building envelope, then
17 start looking at the system efficiencies, the HVAC, the
18 ducts, the water heating.

19 And a key part of that has been verification of
20 the proper installation of the components and the system.
21 And one piece is QII, the quality insulation installation
22 and then the other, and then there's additional HERS
23 inspections for some of the HVAC requirements, and the
24 infiltration and testing that's required.

25 And I'll go into a little bit more detail here.

1 Then we're also look at equipment and plug loads. And
2 Title 24 has addressed lighting in both commercial and
3 residential buildings in the form of mandatory
4 requirements, specifically for residential. There's also
5 the interest in looking at additional loads.

6 And as I think Martha's previously showed, and
7 Jon mentioned that, you know, there's a lot of energy use
8 in plug use that currently isn't regulated in Title 24,
9 and so the CEC staff and the IOUs are looking at how to
10 incorporate some of that with some lighting, and HVAC,
11 and other plug load requirements.

12 Then the other thing that the energy -- that the
13 standards are looking at, the Title 24 standards, for the
14 first time is looking at renewables. So, I shouldn't say
15 for the first time, there have been some solar, thermal,
16 water-heating requirements for solar-assisted water
17 heating. We are starting to look at solar PV and solar-
18 oriented developments.

19 And then there's also, this is all part of the
20 goal of what the Title 24 base code is looking at, and
21 then there are additional REACH codes that will go into
22 the CAL Green requirement and provide a consistent goal
23 and set of requirements that can be adopted by REACH
24 communities, if they so choose.

25 So, I'm not going to go into the details of this,

1 both in the interest of time and because this isn't
2 really the focus of this session, but I wanted to just
3 provide some illustration of what we, and again
4 collectively the Energy Commission, the IOUs, and all the
5 stakeholders, and in the workshop process that the Energy
6 Commission has been holding, where we have found some of
7 the potential energy savings.

8 And the middle column here is looking at analysis
9 that has shown that there is some efficiency levels that
10 can be 44 percent more efficient than the 2008 code, the
11 current code, and then also comparing where the Energy
12 Commission is currently looking at 33 percent, which gets
13 to that first step.

14 There's glazing requirements, there's insulation
15 requirements that include both walls, cavity insulation,
16 as well as rigid insulation, swilling requirements.

17 I'll go through real quickly some of these
18 acronyms. RHT, raised hill tresses, so the idea that the
19 insulation at the corners don't get crunched up and then,
20 therefore, lose some of their capacity.

21 Looking at roof reflection values, looking at
22 additional roof deck insulation, looking at radiant
23 barriers and the requirements for roof ventilation,
24 looking at duct insulation requirements, and duck ceiling
25 and duct pressure testing requirements.

1 Also looking at ventilation, WHF is whole-house
2 fans. And the difference between in the footnotes there
3 on the graph is that for the CEC staff requirements there
4 are some exceptions for some of these requirements and
5 variations based on climate zones.

6 And so, obviously, where it's less cost-effective
7 to do so, it's not required.

8 There's infiltration and testing requirements.
9 This is changing to be consistent with the air change
10 testing and values that are more consistent with IECC
11 2012 requirements.

12 The three or four air changes per hour is roughly
13 about, you know, somewhere between 30 and 50 percent
14 better than what the current requirement is, which is the
15 7.6 of the CEC staff proposal, although, we have seen
16 that in a lot of existing construction, relatively new
17 existing construction, that buildings are actually
18 tighter than that 7.6.

19 Then we're also looking at QII, again, quality
20 insulation installation. It's standing currently, it
21 just applies to the cavity insulation, the bats that are
22 going in the wall, extending that to rigid insulation,
23 exterior, as well as roof deck insulation.

24 The DHW compact design is basically the idea that
25 the water-heating system is thought out ahead of time,

1 that the heating loads, the draws, the kitchens and the
2 bathrooms are not necessarily centrally located, but
3 located in the same area so that your runs are smaller
4 than they would otherwise need to be, and that they're
5 close to the water heater so that there's less of pipe
6 losses.

7 And again, the first presentation -- or this
8 information that's on this graph in the table is the
9 package requirement which, as I think everybody knows,
10 sets the basis for the performance approach.

11 So, we're not saying that this needs to be done,
12 but we're saying that this is going to be the model
13 that's used to set the budget for the performance
14 approach and potential tradeoffs.

15 The other thing that we're looking at in terms of
16 tradeoffs are higher efficiency of air conditioning,
17 furnace and water-heating measures. There are
18 considerable issues with Federal preemption on air
19 conditioning efficiencies and the Energy Commission is
20 looking at ways around that, as having alternative
21 options that can encourage higher efficiencies, and
22 looking at other tradeoffs with HVAC equipment, looking
23 at evaporative technologies that could be used.

24 Again, with equipment the current emphasis that
25 we're looking on are upgradable thermostats that address

1 demand response.

2 We're looking at lighting requirements, both
3 increasing the efficacy to high-efficacy requirements in
4 kitchens and bathrooms, and then providing credit for
5 even higher-efficacy lighting, including outdoor lighting
6 controls.

7 We're also looking at several HVAC compliance
8 options, including the night ventilation system that will
9 allow some credits for night ventilation, looking at
10 thermal control requirements and where they make sense
11 and where they don't.

12 Again with the renewables we're looking at the
13 solar water heating, solar thermal for single-family and
14 multi-family buildings.

15 We're looking at solar-ready PV homes, which is
16 basically to say that the wiring needs to be typically to
17 the roof. There needs to be an area on the roof that is
18 accessible for PV. And the solar-oriented development is
19 an idea that, if I'm recalling correctly, it's more of a
20 REACH code option, which is looking at master-planned
21 communities that align streets and so forth to make
22 better access for roofs, for proper solar orientation.

23 We also have been talking in various areas about
24 the house energy budget. The Energy Commission is
25 looking at having larger homes that would use more energy

1 or would want higher allotment of, let's say, growing
2 areas and so forth to trade off against PV and other
3 renewables.

4 The IOUs are also considering looking at a
5 maximum budget that basically says your budget is set,
6 it's not so much a per-square-foot value, but it's
7 actually looking at a maximum cap on the budget and,
8 therefore, larger homes would have to do more to reduce
9 the energy.

10 And I know we haven't discussed this in detail,
11 but that's kind of the idea of where we would go towards
12 the ZNE.

13 Then some of the REACH code options that we're
14 looking at are the unvented attic options, compressorless
15 comfort homes, which is actually a fairly broad topic,
16 which is looking at, again, designing the building
17 envelope so that -- hopefully, I can back up and not hurt
18 Niemeyer's (phonetic) ears. Sorry.

19 Looking at reducing the envelope, maximizing, you
20 know, how efficient we make the envelope. Looking,
21 again, sort of kind of going back to, you know, passive
22 design type of construction.

23 The emphasis here is that we're looking at the
24 ASHRAE standard 55 comfort conditions, and so it would be
25 verifying that the home is within comfort, the required

1 comfort conditions. And the idea that especially in
2 coastal homes that homes do not need to be built with air
3 conditioners, and the code could somehow address that and
4 allow for the energy savings and associated cost savings
5 of not installing an air conditioning -- an air
6 conditioner.

7 And, again, the focus is making sure that it is a
8 comfortable house and not just a house without air
9 conditioning.

10 We're also -- some of the future topics that the
11 IOUs have been looking at is for residences, is improving
12 the ventilation and economizing requirements, really
13 looking at some of the air distribution requirements, and
14 what the fan energy is for fans, and looking at some duct
15 improvements, especially for ducts in unconditioned
16 space, looking at duct materials.

17 One of the things that we're looking at is
18 revisiting flex duct and how well flex duct works, and
19 how easy it is to manipulate it. That isn't necessarily
20 the best for the air flow of the system and can increase
21 the energy significantly.

22 And I think with that, that's my last slide, so I
23 will stop and hand it back over to Martha.

24 MS. BROOK: Great.

25 MS. CHAPPELL: Thank you.

1 MS. BROOK: Great, thank you.

2 All right. So, now what I'd like to do is just
3 before -- oh, you're going to leave right now?

4 MS. CHAPPELL: I've got to head out.

5 MS. BROOK: Oh, great.

6 MS. CHAPPELL: You can answer those questions.

7 MS. BROOK: Okay, I'll answer the code questions.
8 I'll ask myself a question and then answer it.

9 So what I'm going to do, because I think we'd
10 like your involvement for the last 45 minutes of this
11 session, I'm going to just ask a couple of questions and
12 then if you guys are quiet and shy, then I'll ask the
13 rest of my questions at the end.

14 So one thing I wanted to pose, Jon, and Steve,
15 and I guess me is do you -- do you think that we have the
16 right goals, so our 2020 and 2030 goals for zero net
17 energy buildings. Are those the right ones? Should we
18 reconsider those goals or change them in any way that you
19 think is really important?

20 MR. GALANTER: I guess as an aspirational goal, I
21 mean clearly I think it's fine. But, you know, I think
22 that more than myself, you know, folks have asked the
23 question as how practical is it going to be to achieve
24 that goal in particular markets.

25 MS. BROOK: Okay.

1 MR. GALANTER: In some areas it's easier and more
2 cost effective, obviously, and others it's not. Does
3 that say that we back away from still striving for that,
4 I'm not so sure.

5 MS. BROOK: Jon, do you want to comment?

6 MR. MC HUGH: So, I think the goal, you know, the
7 top-down approach where you set a goal, whether it's zero
8 net energy or if you look at, you know, hitting a
9 particular efficiency target, the effect of those goals
10 are really profound.

11 And I'll just give the example of -- I've been
12 participating in the ASHRAE 90.1 process, and if you look
13 for a number of years, and if you look at the difference
14 between ASHRAE 90.1 2004 and the 2007 version, if I
15 remember, the changes were something on the order of
16 three or four percent.

17 and if you look at the -- for the 2010 version of
18 ASHRAE 90.1, essentially, the Executive Board of ASHRAE,
19 along with a little prodding from DOE, they set a goal
20 for 30 percent reduction in energy consumption.

21 And that resulted in something on the order of a
22 25 -- they didn't actually quite hit the goal. I mean
23 there's probably different ways you can slice it or dice
24 it, but it was somewhere on the order of 25 percent
25 reduction in energy consumption.

1 So I actually don't know how a state can make a
2 policy without actually having some goals because,
3 certainly, you know, I've participated in the codes
4 process and unless there is a vision and a goal the path
5 of least resistance is essentially to do fairly small
6 incremental changes.

7 MS. BROOK: Okay, great, thanks. And I guess you
8 guys already heard my pitch at the very beginning as far
9 as the need for a paradigm shift and so I'm going to
10 stick with that. I think the aspirational goals are
11 essential and we have to make a big shift.

12 I mean we've been doing a lot of great things in
13 the State and it's not enough, so we need to push
14 ourselves really, really hard.

15 MR. MC HUGH: I just have one more comment which
16 is if we declare these goals to be aspirational, to me
17 that's kind of a recipe for failure because in general,
18 if it's an aspirational goal, then that sets up the stage
19 for, essentially, well, it's aspirational, I really don't
20 have to hit this.

21 And there's some hard choices ahead and so --

22 MS. BROOK: Right. No, that's a good point,
23 yeah.

24 MR. MC HUGH: And so what you'd want to look at
25 is sort of intermediate progress indicators towards

1 whatever that goal is. I mean you may end up having to
2 change it but if you start off with the assumption that,
3 no, we're not going to hit it, so you say, okay, we're
4 trying to hit this particular goal by 2020, what does
5 that mean what we're going to do by 2015.

6 MS. BROOK: Uh-hum.

7 MR. MC HUGH: You can always reevaluate, but if
8 you don't actually have a hard goal for 2015, you know,
9 you're in a hard place.

10 MS. BROOK: Right.

11 MR. MC HUGH: And I kind of look at the -- you
12 know, when we take goals that are out to 2050, and these
13 kinds of things, you know, it sets the stage for
14 essentially not --

15 MS. BROOK: Procrastination.

16 MR. MC HUGH: Yeah, not doing much, yeah.

17 MS. BROOK: All right, good. Actually, so what
18 I'm --

19 MR. GALANTER: Can I make one other comment on
20 that?

21 MS. BROOK: Yeah.

22 MR. GALANTER: Is I think what you're alluding to
23 is how do you execute on that goal and how do you do that
24 over time, where do you focus? Maybe that's particular
25 markets which can succeed and show the way.

1 MS. BROOK: Uh-hum.

2 MR. GALANTER: Maybe it's marginal achievements
3 across the board but, regardless, that's -- you know,
4 what the execution strategy is, or the action plan as it
5 were, which I think is PUC's desire through their action
6 plans, is how does that unfold, how do you do that.

7 MS. BROOK: Okay, great. And, actually, we
8 should open up the lines to Jordana, too, so that if she
9 wants to respond to any of these, she can.

10 The other thing is I decided to change my mind.
11 What I'd like to do, because I saw Dana's hand go up, so
12 I'd actually think I'd like you guys to just come up to
13 the center podium after each of the questions, so we can
14 all just do this together.

15 MS. WATERS: Dana Waters (phonetic), with the Air
16 Resources Board. I just wanted to follow up on that
17 question and take it maybe one step further given the
18 proposed ZNE definition and the target dates will we be
19 able to achieve the goals by the target dates or do we
20 think we might even be able to achieve it sooner?

21 MS. BROOK: Good, thanks.

22 Does anybody else want to come up and talk about
23 whether they like or dislike our policy goal? Come on
24 up. Just queue up there.

25 MR. GABLE: Mike Gable, Gable Associates. I

1 think the discussion between an aspirational goal and
2 sort of what I call an aspirational goal, I think there
3 needs to be kind of fine tuning. I don't think you have
4 to back off, as Jon suggested, necessarily is the
5 inevitable outcome of an aspirational goal, but I think,
6 for example, I would refer to something called -- I would
7 call it continuum of realistic opportunity, to Steve's
8 point, where you really have to calibrate those
9 opportunities what are realistic, where you can move
10 towards ZNE and be acknowledging the ones where there's
11 still difficulties.

12 If you don't get into carbon trading, if you
13 don't get into certain other areas without that sort of
14 super structure, what's realistic within certain
15 occupancy type of building climate zones --

16 MS. BROOK: Uh-hum.

17 MR. GABLE: -- site opportunity, zoning
18 requirements, and so on. So I think just to move from
19 aspirational to operational a lot more research has to be
20 done to sort of define better where the opportunities are
21 and clarify them. Not so much give up on the
22 possibilities, but to clarify them further.

23 MS. BROOK: Okay, great. Mike?

24 MR. KEESEY: Mike Keeseey, I'm with the Sacramento
25 Municipal Utility District, I'm the Project Manager in

1 our R&D group. I've been working on zero energy building
2 since the year 2000.

3 I'm going to take the opportunity to talk about a
4 few things because that way I don't feel like a pogo
5 stick, coming up and down here.

6 But the first thing I think we would address
7 would be the definition. We like to keep the definition
8 simple, too. We use the simple, "the building uses as
9 much energy as it produces on a source energy basis."
10 This is one also used by the Department of Energy and the
11 National Renewable Energy Lab, if I'm not mistaken.

12 Other things that I would urge us all to look at
13 as we go through this is that in terms of Steve's comment
14 about it depends on the goal, I think you can build zero
15 energy buildings right now and you could do it cost
16 effectively, particularly if you look at it by building
17 segment.

18 Research done for us by NREL indicates that
19 schools can be done, at least in our climate zone, right
20 now. And so it sort of begs the question of how come the
21 State Architect, which has sort of led an effort in that
22 regard, has sort of not mandated it since it seems to
23 work.

24 Getting back to the definition issue, we would
25 also have problems as a utility, I think, with TDV as the

1 definition, or ZNE, because we don't -- it's not clear to
2 us that TDV matches our peak or our load profiles, and
3 that's very important to SMUD. In fact, we also tack on
4 a definition that says zero peak for our zero energy
5 homes, or zero energy building effort.

6 Other things that I think you need to look at is
7 partnering with the groups out there that are already
8 working on this. In particular, the Department of
9 Energy, with NREL, has a zero energy commercial buildings
10 initiative, if I'm not mistaken.

11 Somehow you need to work with them going forward
12 on this because they're working with the large national
13 accounts and, you know, we've got to work with national
14 accounts, right? No ifs, ands, or buts about it, they
15 build most of the stuff around here.

16 And there's others, also, that are working like
17 that, the New Building Institute up in Oregon, and the
18 Oregon Energy Trust, which also has a very robust zero
19 energy building.

20 Things I see that are desperately needed right
21 now on the research end, I'm desperate for some right now
22 on a project, are construction details. Architects and
23 designers claim they know what to do and then when you go
24 out and give them a performance spec they come back at
25 you and say, oh, I don't know how to do that, it can't be

1 done.

2 A real good example is the use of continuous
3 ridge in insulation, particularly on mid-rise and high-
4 rise buildings. They're just scared to death of putting
5 anything more than an inch on. And if you're going to
6 get to these numbers, you've got to put on more than two
7 inches, and that's just one example.

8 So, help us, SCE, we need construction details
9 that can be used over and over.

10 I also think it's desperately needed that we need
11 to sponsor a whole lot of projects throughout the climate
12 zone. We need model homes in each climate zone, we need
13 targeted buildings that are done in each climate zone so
14 that the designers and the builders actually see that
15 they can -- these are show-me people and this how they
16 get shown.

17 MS. BROOK: Uh-hum.

18 MR. KEESEY: And that's where I've been urging
19 this with the PUC.

20 Along those lines, also, the new construction
21 programs need to be -- they need to be changed. Our
22 residential new construction program I think is the only
23 utility program in the country that actual mandates PV as
24 part of the deal. I mean you don't get a construction
25 incentive for high efficiency without PV. And our

1 current program is at 20 percent above Title 24 and
2 requires PV and we're looking at Gen 2, which is going up
3 to 40 percent above Title 24.

4 MS. BROOK: What percent of the load do you
5 require being outside PV?

6 MR. KEESEY: We don't.

7 MS. BROOK: Okay, so it could be a little sample?

8 MR. KEESEY: Well, on each building.

9 MS. BROOK: Okay.

10 MR. KEESEY: It doesn't make economic sense much
11 below one kw.

12 MS. BROOK: Uh-hum.

13 MR. KEESEY: Where was I going with this? Again,
14 it's part of our program. I don't know how we can fold
15 that into Savings By Design, but it probably needs to be
16 considered. And at least in our Solar Smart Program,
17 where we're approaching a 30 percent market share in new
18 construction and adding to that as we speak, and I think
19 if you see with what's going on, at least with production
20 builders, they're moving in that direction in general.

21 I would also urge you to engage with the USGBC on
22 the non-res side because LEAD has -- LEAD's got traction.
23 Unfortunately, LEAD's not an energy performance program
24 and it's woefully lacking in that area. And for some
25 reason it's got the designer's attention. I won't go

1 into my rant about that.

2 Did I miss anything, Dan? I think for the time
3 being that's what I --

4 MS. BROOK: Okay. Well, I want you to pogo back
5 up here if you think of anything else, Mike.

6 MR. KEESEY: Thanks.

7 MS. BROOK: All right, so let's -- if somebody
8 else wants to comment on the goals, then please come up,
9 otherwise I'm going to pose another question.

10 MR. NESBITT: George Nesbitt, Environmental
11 Design/Build House of California and Cal HERS, California
12 Association of HERS raters.

13 I think the goal of net zero energy homes is a
14 good goal. I think what it comes down to is ultimately
15 is that right, or what are the consequences going to be.
16 If we do achieve it, what's the impact on the grid is a
17 very important one.

18 I think we're going to have to really ask whether
19 or not net zero energy will have to be on site or whether
20 it can be off site, as well as considering that we
21 already have renewables on the grid and are increasing
22 that percentage.

23 You also can't get to net zero with solar hot
24 water. You can't get there, it's physically impossible.

25 MS. BROOK: Are you saying that the definition is

1 electricity only?

2 MR. NESBITT: No, because you can't generate
3 energy with solar hot water. You can only generate
4 electricity with solar electric.

5 MS. BROOK: Right.

6 MR. NESBITT: You can generate electricity with
7 solar thermal conversion to electric.

8 MS. BROOK: Right, right.

9 MR. NESBITT: You can put in wind, you can
10 have -- you could have hydro.

11 MS. BROOK: Sure.

12 MR. NESBITT: But basically, the way it is right
13 now, I mean you just -- you literally, you cannot
14 generate energy with --

15 MS. BROOK: Well, you get hot water.

16 MR. NESBITT: Yeah, but that's only part of your
17 budget.

18 MS. BROOK: Right.

19 MR. NESBITT: So you can't produce more than you
20 consume.

21 MS. BROOK: Okay.

22 MR. NESBITT: So unless we figure out to do
23 community scale, and large heat storage, and other
24 complicated things that may not actually be worth it.

25 MS. BROOK: Okay.

1 MR. NESBITT: And I think the better part of the
2 goal is reducing the energy use of the buildings. That
3 absolutely has to be first.

4 And I'd say, just want to reiterate, this is a --
5 this is actually -- this is not a technical problem, it's
6 more a political, economic, getting over, oh, we can't do
7 that, or that's not how we do it, because some of us are
8 doing it in the marketplace today.

9 MS. BROOK: Okay.

10 MR. NESBITT: And some of those are passive house
11 projects, some are not. And I would say you max out
12 currently at about 75 percent above code. I'd say it may
13 actually be impossible to get beyond that. So, I'll say
14 more later.

15 MS. BROOK: Okay, great.

16 All right, anybody else? Dave, did you want to
17 say something?

18 MR. WARE: Yes, Dave Ware, Commission staff. I
19 first want to recognize that it's nice to see George back
20 with his hat on.

21 Okay. For some of us who know George and enjoy
22 and respect his comments in our public meetings regarding
23 the building standards, that was a compliment, George.

24 I have a question both for Jon and for Steve.
25 One of the things that has been heard a lot is that the

1 building industry as a whole is over-burdened with the
2 market transformation that is needed to meet ZNE. The
3 collapse of the lending market has led to much slower
4 home building activity than has been seen in a very long
5 time.

6 The home building industry and its ancillary
7 impacts, when it is in a traditionally growth segment or
8 cycle has a tremendous impact on businesses and
9 development that cross-cuts the market structure of our
10 State.

11 So, burdening that industry with the objectives
12 that ZNE is trying to achieve, we are being told is
13 inappropriate at this time.

14 What can both of you share from each of your
15 respective sides on that particular question?

16 MR. MC HUGH: Okay. I'm sure Steve will have
17 some interesting things to say as well.

18 So, you know, this is a good question, Dave, and
19 we actually hear about this very issue every single code
20 cycle, so it's appropriate to bring it up. And I've been
21 doing some thinking about it, as well, based on some
22 comments recently.

23 And I think, you know, one of the things to think
24 about is what is -- you know, you saw earlier that graph,
25 or the McKinsey curve that shows the wealth generation

1 versus additional first cost and that sort of thing. And
2 what that indicates is that there are a number of
3 features on buildings that reduce the net cost to the
4 consumer of their -- the combination of their mortgage
5 payment and their utility bill.

6 And our last workshop about the residential
7 standards brought up just that issue. I mean there is
8 this balance that the Energy Commission is trying to
9 strike in terms of the burden on industry and yet, also,
10 their obligation to faithfully fulfill the Warren-Alquist
11 Act.

12 You know, the Warren-Alquist Act asked, you know,
13 to maximize energy, feasible, cost-effective efficiency
14 measures and we're kind of falling short of that. We're
15 actually not maximizing those features.

16 And the argument, you know, understandably is,
17 you know, is how much burden is reasonable to put on
18 builders of new homes?

19 And I actually think this actually relates back
20 to a larger issue. So, the builder of a new home is
21 competing against all the existing buildings and I'm
22 talking -- I'm talking right now about homes. But, you
23 know, half of the homes in the State were built prior to
24 the efficiency standards, the building standards. So,
25 we've got a bunch of old buildings without -- you know,

1 that are actually quite inefficient. And yet, when the
2 buyer is comparing a house versus a new house, they don't
3 necessarily have any information about the consumption of
4 that old house versus the new house.

5 And so I think that's what's really, I think,
6 points to something really quite important that I think
7 would have a huge market impact, which is essentially the
8 rating of all houses so that the builders actually are on
9 a level playing field.

10 Because right now, with the lack of
11 information -- you know, that's one of the things, you
12 know, Adam Smith and all these folks, you know, the
13 markets will find the most optimal mix of resources, et
14 cetera. The key to that free market assumption is that
15 everyone has perfect amount of information. And we're
16 actually in the opposite situation where all you really
17 know is maybe the school district, and the neighborhood
18 and that kind of thing, and what it looks like on the
19 outside. But all of this stuff is kind of invisible.

20 So, I think -- I think there's two issues. One
21 is that, you know, that the burden is appropriate, but
22 that the builders actually have to have a way of
23 differentiating their product. And, you know, Mike can
24 probably talk to what he's found in terms of what the
25 first cost increment is but, you know, the bigger picture

1 is that even if I say it's zero energy consumption, well,
2 what does that mean compared to the building down the
3 street, it looks relatively new?

4 And so I think rating is a big part of that.

5 MR. GALANTER: I like your comment about
6 essentially a rising tide lifts all boats kind of a
7 thing, and we're not in that mode right now, the tide is
8 actually in the other direction. So, that's when it
9 becomes particularly difficult to do anything in any
10 of -- whether it's an innovative, zero net energy, or
11 more of a vanilla home.

12 I think from the utilities' perspective is -- you
13 know, what we're all about is -- you know, one half of
14 the utility it's focused on emerging technologies, and
15 developments, and trying to facilitate and urge
16 technology development and adoption.

17 On the other side of the house, which is the
18 program side, is how can we defer that burden or, maybe
19 that's the wrong word, but how do we make it easier to
20 actually facilitate that to either monetary compensation,
21 maybe education, those kinds of creative things.

22 So perhaps an absence of those activities, an
23 absence of the effort to try to relieve that burden,
24 maybe I could go along with that.

25 But I think that the idea is to have a

1 comprehensive program to do both. And how successful we
2 will be to -- you know, depends on, I guess, how much
3 groaning occurs.

4 But, you know, I think the intention is there,
5 the intention is to move things along in a very positive
6 way by working with the industry, working with the
7 Commission, working with the utilities participating, and
8 everybody to make it doable.

9 The question is, you know, the pace of that I
10 guess is what causes this discussion of burden.

11 MS. BROOK: Okay. All right, thank you.

12 Yes, come on up.

13 MR. HAMILTON: Daniel Hamilton, Sacramento
14 Municipal Utility District.

15 To follow up, and I think this has been in part
16 inspired by Mike's comments, but it feeds right into
17 this. I think with our goals of zero net energy we can't
18 forget that this whole thing was started because, as
19 Martha mentioned, this is building on AB 32, from 2006,
20 which is a carbon reduction goal.

21 And as Mike said, from a utility perspective we
22 care much more about peak energy use than umbrella energy
23 use because the dramatic carbon effects that we get are
24 from reducing at the peak, when those peaker plants,
25 which are the most inefficient things for every one of

1 our utilities are in effect.

2 And I think until we start measuring that along
3 with the overall energy use, we're not going to be true
4 in terms of achieving the maximum efficiency in terms of
5 carbon reduction that we can get from these measures.

6 So, I think framing it as zero net energy is
7 probably much more easily understood by the general
8 public and it's going to get much more support because
9 the concept is understandable.

10 But I think that within the papers and research
11 that we're doing, we need to be cataloguing the peak
12 energy use as well because a huge portion of the energy
13 savings that we're getting from the buildings is
14 reflecting in the utilities' operations, themselves, not
15 just in there.

16 MS. BROOK: Uh-hum.

17 MR. HAMILTON: And similar to your point that how
18 do we get the building industry to buy into these
19 additional costs when everything is going in the exact
20 opposite direction? I think the selling point to
21 homeowners and homebuyers comes in the energy costs,
22 themselves. And we're talking about what we're going to
23 be in the next code cycle, and the next code cycle. In
24 2020, every home in this State is going to be on time-of-
25 use rates. And as they are, those peak use rates are

1 going to be what's the most important to them, and what
2 the builders are going to be able to use as selling
3 points to homeowners, and it's going to be a way we can
4 universalize how much benefit they get out of this and
5 what the price premium should be on those.

6 So I think -- I think we can't forget about the
7 peak energy discussion here and I don't think we can
8 underestimate its importance in terms of the goal,
9 whether it's a publicly stated goal or whether it's one
10 that we just keep in the back of our minds as we're going
11 through this. I think that we need to be giving it its
12 due attention because it's critical to accomplishing
13 those AB 32 goals that this whole process is about.

14 MS. BROOK: Great, thanks.

15 MR. STONE: Nehemiah Stone, Benningfield Group, a
16 recovering builder. I'm telling you that so it will give
17 you some context for one of the two comments.

18 I have two comments, one specifically to Dave's
19 question and one more broadly to the goal, and both are
20 going to take us a couple steps back in history.

21 I worked with Dave on the '92 standards here at
22 the Commission and, you know, as Jon said every single
23 iteration of the standards the building industry says,
24 wait a minute, you're making homes too expensive, people
25 aren't going to be able to afford them.

1 So one of the things that we did at that time
2 was -- you know, the two largest inputs to home
3 construction at that time, and I'm not sure if it's still
4 true, but at that time were labor and lumber.

5 And so what we did is we went back 40 years and
6 charted the price of labor and lumber, you know, as it
7 goes up and down. And then we took a typical home that
8 was -- you know, and charted what's the selling price of
9 that typical home in the same area over time.

10 And what happened was you saw that the curves
11 were exactly opposite, almost exactly opposite. As the
12 price of lumber and labor was falling, the prices of
13 homes were going up. As the prices of homes were coming
14 down again, labor and lumber was going up.

15 More than probably any other good we can think
16 of, housing is demand driven, not inputs driven. It's
17 not -- you know, what we do in the standards quite
18 honestly does not affect the price of the home. The
19 price of the home is affected by what the realtor -- or
20 what the builder can get in that market at that time,
21 period. And they will go bust building when they can't
22 afford to, so they keep building, and they will just
23 totally fill up their bank accounts building when it's
24 cheap and everybody's paying a lot. So, that argument
25 ought to be disconnected.

1 In fact, I would encourage the Energy Commission
2 to do a more comprehensive, detailed study on that same
3 thing and put the question to bed, you know, once and for
4 all.

5 The next step back in history is even farther
6 back. When the standards first started, the basis of the
7 standards was a passive solar home. That was the basis
8 back in 1977. The home that was essentially designed by
9 what has become NREL, but it was CERI (phonetic) at the
10 time.

11 And in almost every iteration of the standards
12 since then we've devalued one of the most important
13 things that makes passive homes work and that's mass.
14 You know, mass has just become less and less important.

15 And it's true in how we're modeling and trying to
16 understand the difference more than anything else.

17 So my comment, Martha, is in the goals of getting
18 to net zero by 2020 it's really important how we model,
19 how we look at what they're building. I mean how
20 we're -- I mean we can change the modeling techniques to
21 say buildings are net zero today, if we want to. But,
22 you know, honesty requires that we take a look at how the
23 building really performs and that means, then, that we
24 have to get serious at how we're looking at mass, its
25 interaction with the ambient air and its interaction with

1 the heat gain capability of fenestration, et cetera.

2 And I hope that in the goal of getting to net
3 zero that we look -- there's an adequate amount of effort
4 put to making sure the models represent reality as
5 closely as we can.

6 MS. BROOK: Okay, thanks. And it's a great kick
7 for our new simulation engine, so thanks.

8 MS. GUPTA: Smita Gupta, Itron Consulting and
9 Analysis. I would just like to bring attention to one
10 aspect of getting to zero net energy that's relatively
11 less discussed, at least, and that is the regulatory
12 values that are required to overcome for the projects to
13 get to zero net energy, having recently got a glimpse of,
14 you know, working in the trenches of a real project, the
15 West Village, U.C. Davis project. So there is technology
16 issues to get to zero net energy, then the market and the
17 cost. But a big part of the cost is also being realized
18 as some things aren't doable because of regulatory values
19 there. And I'll give just one example of, you know, the
20 community level as not having virtual net metering
21 available. So it's just a question to like State
22 agencies, CPUC and CEC involved in this, that that also
23 be -- it's not like the highest or the first step focus,
24 but that also, you know, not lose track of that and
25 somehow have a venue or a group in order to -- at least

1 the early ZNE Projects -- to have that ability to discuss
2 and get these regulatory values out of the way because
3 they invariably conflict with other aspirations and goals
4 of the State agencies.

5 MS. BROOK: Great, thanks. So before we have
6 other general comments, I just wanted to kind of put
7 another question out there. Go ahead.

8 MR. ALVAREZ: Manuel Alvarez, Southern California
9 Edison. Actually, the discussion here today is well
10 worthwhile, but since we're under the IEPR Docket, I kind
11 of want to remind the folks on the question of goals; two
12 weeks ago we met on the California Clean Energy Program
13 and that discussion is a series of events going on
14 dealing with goals and measurements and metrics. And I
15 guess I'm asking you folks to kind of keep in mind that
16 activity in conjunction with this activity because one of
17 the comments that came off in those workshops, and people
18 are filing their written comments now, was the notion
19 that people are looking at different objectives in terms
20 of silos. And so I just want to kind of keep you aware
21 of that issue, that when you look at zero net energy
22 homes, don't look at it just as a silo for this
23 particular program, but look at it across the board on
24 what kinds of measurements and goals and metrics you're
25 going to develop under the umbrella of the Clean Energy

1 Future activity, that is also part of the IEPR Docket.

2 MS. BROOK: Yeah, great. Thank you. Okay, so
3 the next thing I just want to kind of poke at is, if we
4 accept the goal and we want to get to zero, how should we
5 get there? You know, one of the examples that Cathy
6 showed, and it's also in our draft report, it's a linear
7 approach, basically, it's a stair step to zero. So, is
8 that the best path? Or should we start hard, take a big
9 dip, and then slowly slide into zero? Or should we coast
10 for a while and then just take a deep dive at the end and
11 get to zero?

12 So, I mean, it's easy to describe linear and it's
13 easy to put out there, it doesn't mean it's the right
14 path, so that's kind of the question for everybody. And
15 I would like the panel to respond first if they want to,
16 if they want to pass, then we'll let George talk.

17 MR. GALANTER: Well, I would just say, and I
18 already made this comment, I think the path forward is
19 either incremental steps across the board in all markets,
20 or it's those most likely where you're going to find
21 success, that is, economics is going to drive it a little
22 bit more easily than maybe some other markets. So that,
23 you know, what the actual strategy is, I don't know that
24 that's thought out yet, but it seems to me that that
25 would be a way. And I would kind of lean towards the

1 segment sort of approach, first. But that's just my
2 opinion.

3 MS. BROOK: Okay.

4 MR. MCHUGH: I've actually been more focused on
5 zero net energy homes and the reason is just that 2020 is
6 before 2030, so it's kind of driven the focus, as well as
7 my Energy Foundation project that's focused on homes, and
8 I'm assuming that's part of their motivation, as well.

9 Like a lot of things in nature, sort of a law of
10 diminishing returns, and so my expectation is, you know,
11 getting the last bit of the way is going to be a lot
12 harder than the first steps, so my take is that you
13 really should be trying to make big inroads on the
14 efficiency reductions early on because if you push hard
15 on those things, there are still going to be issues that
16 you're not going to be able to hit for various
17 feasibility issues, market issues, etc., and by pushing
18 hard on those things, you identify those, and those
19 incremental things are things that you take up later.

20 Now, the other thing, now that Cathy is back, I
21 would also like to bring up that, you know, Cathy was
22 showing sort of the 48 percent and 33 percent savings as
23 to savings estimates for what they call "Package A,"
24 those are -- you might say, "Wow, that's fantastic," and
25 those are big numbers, but the thing to remember is that

1 those numbers, the 33 percent which is where the
2 Commission is looking at right now, that reduction is for
3 essentially just HVAC and heating and water heating, and
4 so it doesn't include the 50 some percent of plug loads,
5 and it doesn't include the 17 percent of lighting load.
6 So what you're really talking about is 33 percent of
7 essentially 31 percent of electricity, so you're talking
8 about a 10 percent reduction in electricity consumption
9 in homes and a larger fraction for gas consumption.

10 So, just to point out that that might seem like a
11 really big number, but in the big picture, it's actually
12 fairly incremental.

13 MS. BROOK: Uh huh. George.

14 MR. NESBITT: So, first I'd like to thank Dave for
15 the compliment, this cycle is the first cycle I've
16 participated in the Code updates, and I know what I say
17 is not always popular, or does not want to be heard, or
18 we're not ready to deal with, yet I have found that if
19 you make enough suggestions, and some of them are good,
20 that some of them will stick, which is rewarding because
21 most of my colleagues sit back and complain about how bad
22 the Code is, and this and that, yet if I look around the
23 room, none of them are here. So, they'd rather complain
24 about it than do something about it.

25 So then actually to address his question about

1 burdening the industry with the market being down, I
2 would say now is the best time because, in a down market,
3 you keep your best people, okay? That's when you've got
4 your best people. In an up market, you're desperate for
5 anybody to show up and get that house built, that's the
6 worst time to try to train and education.

7 So if we start with the best quality core, teach
8 them right, as the market recovers, there's more work;
9 hopefully they will still be there and they will be able
10 to maintain some sense of quality. It is like, "What day
11 of the week was your car built?" Apparently there are
12 different days of the week. So you're better off buying
13 a house built in a down market than a booming market.

14 And then, yeah, we may want to go more aggressive
15 to start, with the realization that one of our big
16 problems is enforcement. I've had people say to me,
17 "Well, why are we changing the Code when I already don't
18 understand it or it's not being enforced?" So,
19 enforcement will always lag behind the Code and the Code
20 always lags behind practice, so perhaps going more
21 upfront may actually be a better -- the more we put off,
22 the harder it will be, and we probably want to focus more
23 on quality than on quantity, that's really where we're
24 at.

25 And I just kind of want to hit on the zero net

1 energy definition. I kind of find the discussion funny
2 because three years ago, I participated in the Title 20
3 HERS Phase 2 rulemaking, which was all about defining net
4 zero energy, and the Commission adopted it in December of
5 2008 and it's been technically in effect since September
6 of 2009, so we have a definition, whether it's the right
7 definition or not. And I think a lot of people actually
8 don't really realize that this applies to new
9 construction. So, HERS 2 has been cast as an existing
10 home thing, which it's not, it applies -- how many new
11 homes have been rated yet? I don't know. And I've heard
12 experts in our industry say, "Well, we don't have a
13 definition." And I kind of have to look at them and say,
14 "Really?" So, and the other thing is the HERS 2, most
15 people -- it's often been said that it doesn't apply to
16 multi-family, which it clearly says in the new HERS
17 booklet that it applies to all single family, multi-
18 family, low-rise. While there may be issues there, which
19 there are, but that's a different story.

20 And I just want to hit on the TDV because I think
21 were increasingly -- TDV is giving us the wrong answers.
22 In non-air-conditioning climates, and we're looking more
23 and more like an air-conditioning climate, which is
24 driving us more, and we're already doing it anyway just
25 because the market provides us with low solar heat and

1 coefficient windows where we may technically save TDV
2 energy, but we're actually increasing real energy use.
3 And I also think, from the perspective of goals like AB
4 32, if we're really talking about 80 percent reductions
5 over 1990 levels by 2050, the problem with TDV and even
6 source energy is it's purely the peak electrical. I
7 mean, it really drives -- that's what drives it. And
8 although that does reduce energy use and definitely has
9 carbon impacts, we're not going to get to those deep
10 levels purely by having a metric that is really focused
11 more heavily on that.

12 MS. BROOK: Okay, thanks, George. Karl. There's
13 a good face I haven't seen in a long time.

14 MR. JOHNSON: Yeah, it has been too long. Nice
15 to see many of you folks. Well, you asked about the
16 strategy to get to the net zero goals, so I wanted to
17 comment on that. I think what we haven't realize quite
18 is that, if we have a goal nine years from now, like net
19 zero, and 40 percent of existing stock transferred to net
20 zero, as well as requiring it, one, that's awesome, two,
21 getting there, you have to shift perspective, and so we
22 have two choices. We have the continue the standard
23 practice in incremental savings over three years
24 sections, and what we'll find is we trap savings by doing
25 that, and you make the next round harder to get to

1 because you save 20 and 30 percent; so, choice 1, you go
2 in and say 20, 30 percent, get a nice two-year payback,
3 the standard rebates, all of this is great. But you have
4 to get 60-80 percent according to our plan, like I'll use
5 the lighting plan because I helped develop it with the
6 CPUC. And so, to get that 60-80 percent goal in nine
7 years means you have to do that 20 and 30 percent savings
8 two or three times. We do not take that into our
9 strategy now. The second choice is deep energy savings,
10 or best practices. What the lighting plan bases itself
11 around is best practices to get to net zero, which is
12 saving 60-80 percent of electricity use for lighting in
13 our state by 2020. So, to do that, that means the best
14 practice is, for the lighting example, you go into an
15 office and you can do energy saving lamps, say, 20-30
16 percent, or a whole variety, or you could do task ambient
17 lighting and save 60-80 percent, and you do it once, and
18 you accumulate the savings for the next nine years.
19 Otherwise, you incrementally trap those savings that you
20 could be getting right here, right now. And so that is
21 illustrated in the Lighting Technology Overview and Best
22 Practice summary, we have six examples and they say the
23 exact same story. And what it says is we need to look at
24 going back two and three times to realistically evaluate
25 that option vs. going back now aggressively. And so my

1 quip is you make the best practices the customer's best
2 choice because, right now, we make it the continued low
3 hanging fruit choice, and it's our worst enemy to get to
4 net zero in nine years.

5 MS. BROOK: Okay, great. Thank you. So, come on
6 up, Pat. I do have other questions, but come on up.
7 That's what we're here for.

8 MR. SPLITT: Pat Splitt from App-Tech. I was at
9 the Building Standards Commission, so I'm not sure if I'm
10 coming in at the right spot, or if I missed my spot.

11 MS. BROOK: It doesn't matter, the spot is yours
12 now.

13 MR. SPLITT: Okay. So I just had a couple of
14 questions or comments, basically details, essentially
15 residential comments because that's what we're mainly
16 talking about. And one thing I want to be sure to get to
17 higher energy efficiency performance, one thing I have a
18 problem with now that should be addressed is being able
19 to get credit for newer technologies, new mechanical,
20 water heating systems, efficient ventilation systems with
21 real efficient motors. There's really no way of getting
22 credit for that now, so there's no incentive for people
23 to put them in their building. So I think we have to
24 make sure that the compliance software enables us to take
25 credit for not just what's available at the instant you

1 release the software, but have it enabled so that it's
2 easy to put new things in there.

3 MS. BROOK: Okay, yeah.

4 MR. SPLITT: There's also, talking back to the
5 original goals of passive solar, that's one thing I want
6 to make sure is still in there, that we can take credit
7 for passive solar and model things, and that we're not
8 stuck with these low SHGC requirements and then get
9 penalized if I want to actually get some sun through the
10 glass. So I'd like to make sure the program really can
11 accurately model passive solar, both solar gain through
12 the glass, and thermal mass to make sure that the system
13 actually works.

14 MS. BROOK: Okay.

15 MR. SPLITT: Then, the last thing, and I
16 mentioned this before, is also going on some of the other
17 comments of why wait, is I think we should make mandatory
18 the QII duct blasting and blower door requirements
19 because these are basically just ways of getting people
20 to do what they're actually already supposed to be doing,
21 which is doing things correctly, and I can't see how the
22 Commission can allow people to still not do them
23 correctly. And then, have other programs where people
24 can come in and retrofit these buildings that were just
25 built to fix the problems that should never have been in

1 there in the first place. So, that's it.

2 MS. BROOK: Okay, good. So I was reminded that
3 we're officially out of time. But I do want to allow
4 anybody else to come up and make their comments, and I'm
5 okay burning a little bit of the lunch time if you are,
6 but we probably should try to cut it off in five minutes.
7 Make sense? Anybody?

8 MR. STRAIT: As a quick note to the people that
9 are attending remotely, if you want to, type your
10 comments into the chat box, everything that has been
11 typed into chat is being recorded and will be treated the
12 same as the comments delivered in person or in audio
13 format. So, if there are additional comments you want to
14 make, or over the lunch period, go ahead and type them
15 in, we're recording the entire chat log.

16 MS. BROOK: Great, okay, well, I'm not going to
17 pose any other questions, then, because I think that
18 would -- I'm kind of too hungry for that. So the stomach
19 wins, and thank you very much, I've had a great time this
20 morning and I really appreciate everybody's
21 participation. Thanks.

22 (Recess at 11:34 a.m.)

23 (Reconvene at 12:00 p.m.)

24 MR. PENNINGTON: Good afternoon. My name is Bill
25 Pennington. I'm the Manager of the High Performance

1 Buildings and Standards Development Office at the Energy
2 Commission. And I'm sorry I had to miss the whole
3 morning, I'm sure Martha was very entertaining and the
4 panelists did a great job. Crazy fire drills are going
5 on at the Commission all the time, so I was not able to
6 be here. But I'm here now, and so we're going to be
7 talking about Existing Buildings this afternoon on this
8 panel, and just wanted to give you a quick kind of
9 summary overview of why we're talking about this and what
10 we're going to talk about.

11 So, really, the elephant in the room for us is
12 that the Energy Commission has been given a new mandate
13 and new authority to pursue a comprehensive, ongoing,
14 statewide program to achieve energy savings in
15 California's existing buildings under AB 758. And so
16 this is -- a main purpose of today's presentations is to
17 give you an idea about where we're headed with the work
18 under this program.

19 This mandate was looking at really a portfolio of
20 approaches to increase the energy efficiency in existing
21 buildings and there were a number of program components
22 that were specified in the legislation that we need to be
23 paying attention to and build into the program. Those
24 components are listed here. Public Awareness is a
25 significant part of this, certainly Workforce

1 Development, looking at ways to finance energy efficiency
2 improvements and get financing as a contributor towards
3 the project cost. The legislation was strongly
4 indicating that the Commission should be developing
5 energy performance ratings and disclosures for buildings,
6 potentially at a variety of different points in the life
7 of the building, and kind of how we would do that, the
8 Commission needs to be figuring out.

9 Just for emphasis, repeating workforce
10 development again here a second time, I don't know who
11 did these slides, we're supposed to be developing energy
12 assessments in residential buildings and non-residential
13 buildings, and figuring out how to do that effectively,
14 how to give building owners recommendations effectively.
15 And ultimately, you know, a lot of this stuff is about
16 the process of accomplishing upgrades, and so we are
17 definitely expected to have this program result in an
18 increase in the efficiency improvements that are
19 happening in these buildings and how to do that.

20 The statute gives the Commission broad authority
21 to address these things through both regulatory and non-
22 regulatory approaches, and so we will be looking at, as a
23 component of this program, what regulations make sense.
24 We're thinking that those regulations have more to do
25 with rating buildings and disclosing ratings for

1 buildings, and also getting to the requirement for
2 improvements in existing buildings through regulation.
3 So we're expecting to be there at some point. We need to
4 have the market infrastructure related to these other
5 program components to enable the public to understand
6 what's expected and the value of doing improvements, so a
7 number of these things we would be pursuing through a
8 non-regulatory strategy.

9 Of course, this program related to existing
10 buildings builds on a lot of things that are currently
11 being used to try to achieve energy efficiency in
12 existing buildings. The Building Energy Efficiency
13 Standards have requirements, everyone knows that they
14 have requirements for newly constructed buildings, but
15 there also is a pretty substantial emphasis in the
16 standards on additions and alterations to existing
17 buildings, so that's an avenue to affect existing
18 buildings. Our appliance regulations affect equipment
19 regardless of where they're installed, whether it's newly
20 constructed buildings or existing buildings, so probably
21 a good half of the impact of appliance regulations are
22 related to existing buildings.

23 The PUC has done a huge and marvelous job of
24 developing a long term energy efficiency strategic plan
25 that projects what the State should be trying to

1 accomplish out through 2020 and also factors in what
2 should be the role of the IOUs in achieving that
3 strategic plan.

4 The Commission has been heavily engaged over the
5 last couple of years in administering a large amount of
6 money to existing buildings through the American Recovery
7 and Reinvestment Act funded programs. We have contracts
8 at a statewide level and we have contracts with regional
9 governments and consortia of regional government
10 contracts with individual local governments, and those
11 are really designed going in. The coincidence of AB 758
12 and the timing of getting the ARRA money was just right
13 about the same time, and a conscious design for these
14 programs was to try to pilot the program component that
15 AB 758 expects in this comprehensive statewide program.

16 At the same time that we're focusing in-house on
17 ARRA funding, we saw a real need to collaborate widely
18 with all of the other players in the marketplace that are
19 trying to achieve energy efficiency improvements in
20 existing buildings, and out of that came a collaboration
21 called the Energy Upgrade California, that is a
22 collaboration between the Energy Commission and the PUC
23 and the utilities, and local governments all over the
24 state, and with the private sector that is doing the work
25 in these buildings, the contractors, the HERS Raters that

1 are doing ratings, and the various people in the chain of
2 trying to accomplish retrofits. So it's a huge
3 consortia, probably pushing \$500 million of money in
4 total, that is being administered through this Energy
5 Upgrade California effort. And it's going to be our
6 intent to try to learn as much as possible about that
7 effort as we move into figuring out what to do to
8 implement AB 758.

9 So this is just a timeline, a rough timeline for
10 what we see happening under AB 758 in the first couple of
11 years here of feet on the road, feet on the ground.
12 In 2011-'12, we've got the ARRA pilots, we've got the big
13 effort with Energy Upgrade California, we are in the
14 process of adopting regulations responding to AB 1103 to
15 have disclosure of energy use for commercial buildings to
16 be made at point of sale, point of lease, point of
17 financing. Early on in this period, it's our expectation
18 that we're going to be focused on doing a building asset
19 rating system for commercial buildings and, so, that's
20 there.

21 And two of the speakers on the panel today will
22 be talking about - they are technical support contractors
23 under AB 758 and they are going to be talking about the
24 kinds of things that they're going to be focusing on in
25 their work.

1 The next phase after this kind of infrastructure
2 development phase will be a phase where we will be trying
3 to put ratings and disclosures into effect, and we see
4 that as being in the 2012-'13 timeframe, and so we'll be
5 looking at regulations for rating disclosure and then
6 moving on to what would we be doing related to mandatory
7 upgrades. And then, in Phase 3, that would be when we
8 would start addressing the mandatory upgrades. So, in
9 the 2014 timeframe we would be looking at that, that's
10 our rough kind of approach to how we would do this over
11 time.

12 So we have three speakers today on the panel to
13 talk about what they're doing that kind of relates to
14 that overview and to existing buildings. Cathy Fogel,
15 who is a Senior Analyst at the PUC, will be doing the
16 first talk, and then Eliot Crowe and Nehemiah Stone, that
17 are contractors for the technical support work, are kind
18 of going to do a little bit of a tag team on some slides,
19 and Eliot will be focusing on what we plan for non-
20 residential, and Nehemiah for what we plan on
21 residential.

22 So, the first speaker on the panel is going to be
23 Cathy Fogel and, Cathy, are you on the line?

24 MR. STRAIT: One moment, Cathy. Cathy, you
25 should be unmuted now. Can you hear us?

1 MS. FOGEL: I can. Can you all hear me?

2 MR. STRAIT: Yes, we can.

3 MS. FOGEL: Okay, how is the volume?

4 MR. STRAIT: Volume is good, we do have volume
5 control on our end.

6 MS. FOGEL: Okay, great.

7 MR. PENNINGTON: So before Cathy starts, I'm
8 going to give you a little background on Cathy. She is a
9 Senior Analyst for Residential Programs at the PUC,
10 including Residential New Construction and Zero Energy
11 Programs. She is involved in oversight of the Utility
12 Programs to assure that they are carrying out the
13 expectations of the PUC that are in the Strategic Plan,
14 and in the Guidelines that the PUC provides for directing
15 the IOUs. She oversees the Utilities Single and Multi-
16 Family Energy Upgrade California Programs at the PUC.
17 She has a PhD in Environmental Studies from UC Santa
18 Cruz, and has had a 20-year history of policy analysis in
19 a variety of environmental areas and, for the last 10
20 years, has specialized in Climate Change Mitigation and
21 Policy. So, Cathy, take it away.

22 MS. FOGEL: Okay, great. I'll wait for my
23 presentation to get pulled up. I hope everybody had a
24 good lunch and is not too full so you won't fall asleep
25 here.

1 MR. STRAIT: Not a problem, let me just get your
2 slides loaded here.

3 MS. FOGEL: Okay.

4 MR. STRAIT: All right, simply tell me whenever
5 you want a slide advanced.

6 MS. FOGEL: Okay, super. Okay, good afternoon,
7 everybody. Again, welcome back from lunch, hope
8 everybody had a nice break and hopefully it's not too
9 warm out there in Sacramento. I'm happy to be able to be
10 presenting today and really looking forward to the
11 comments and discussion for this panel. Next slide,
12 please.

13 So just a brief overview of what I'll be
14 presenting. I'm going to start with a little background,
15 which may be a real review for a lot of you, but there
16 may be some of you in the room a little newer to this, so
17 just to run over that real quickly. I'll talk a little
18 bit about the California Energy Efficiency Strategic
19 Plan, which Bill gave high accolades to, which is very
20 nice, thank you, and which is adopted in 2008 and is the
21 groundwork for many of the utility programs that we
22 oversee at the Commission. I'm going to run over
23 residential and commercial building programs that we have
24 in place currently, and touch briefly on related
25 programs, and then finish up with what I see as some of

1 the challenges and opportunities given AB 758. Next
2 slide.

3 So just as a review of how the CPUC operates and
4 does our oversight over the utilities, we are currently
5 operating on a three-year budget cycle, although this
6 will be the second budget cycle in a row where we will
7 have a bridge year, so needless to say, the Commission is
8 looking at that issue, or will be, in the next little bit
9 here. But that's what we have right now and the CPUC's
10 role is to provide policy guidance over the IOUs for
11 this.

12 So the CPUC is statutorily mandated to set Energy
13 Efficiency Goals, which are based on Efficiency Potential
14 Studies. We are required to ensure that the Utilities
15 first procure all cost-effective energy efficiency as
16 part of their procurement plans, and we measure this
17 through a portfolio level TRC, a Total Resource Cost
18 test, that measures the net resource benefits from the
19 perspective of all ratepayers. So, under the TRC tests,
20 the benefits, the avoided costs of the supply-side
21 resources and the costs encompass the cost of the
22 equipment, are measures installed and the costs incurred
23 by the Program Administrator. And again, that's set at
24 a portfolio level. On its own, the Commission has
25 established a system of shareholder incentives, the Risk

1 Reward Incentive Mechanism, by which utilities receive
2 incentives or, at least in theory, penalties if they fail
3 to meet the goals. And the CPUC has also established a
4 20 percent requirement of the budget that goes to third-
5 party and local government programs, each program cycle.

6 And in 2008, the Commission adopted the
7 California Energy Efficiency Strategic Plan and that is a
8 final kind of overlay of policy guidance provided to the
9 utilities. These are the main areas of policy guidance,
10 there are other areas, as well.

11 The Utility Portfolio Applications come in
12 generally at least six months to a year before the
13 subsequent program cycle. In those applications, the
14 utilities have to demonstrate that they meet the goals,
15 that their budgets imply a net benefit and cost-
16 effectiveness test for ratepayers and, this last program
17 cycle, alignment with the strategic plan. Again, the
18 utilities are the administrators of the portfolio side,
19 CPUC decision, and the Energy Division where Jordana and
20 I work, we not only do oversight over these program
21 implementation, but our colleagues run a large valuation,
22 monitoring, and verification effort of each program
23 cycle.

24 So the program cycle of 2010 through '12, it's a
25 \$3.1 billion portfolio and there's also \$750 million

1 approved separately for low income programs. And for the
2 three years, we have combined saving targets adopted for
3 the utilities of 7,000 gigawatt hours, 1,500 megawatts,
4 and 150 million metric therms. So that's about equal to
5 three major power plants deferred through our energy
6 efficiency programs over the next three years, or over
7 the three-year cycle. And the efficiency is treated as a
8 resource and, so, it's incorporated into procurement
9 plans, and just to note that Public Good Fund comprises
10 about 43 percent of this total \$3 billion budget, through
11 the Gas Public Purpose Program surcharges on your utility
12 bills, and also the Electric Public Goods charge. And an
13 additional nearly 60 percent is funded through utility
14 procurement dollars and we and the utilities pool all of
15 that into one funding source to go after this cost-
16 effective portfolio.

17 As I mentioned, we've had bridge years for the
18 last program cycle and will again this year, and that
19 will be addressed in the next six months or so, I
20 believe. And we're hoping for a portfolio guidance
21 decision to provide guidance on the next utility
22 portfolio sometime around June of next year. Okay, next
23 slide, please.

24 So the California Energy Efficiency Long Term
25 Plan was ordered by the full Commission to be developed

1 in 2007 as a strategy to achieve all cost-effective
2 energy efficiency in its efforts. As many of you will
3 know, it was led by Commissioner Dian Greunich, who was
4 the assigned Commissioner on Energy Efficiency at that
5 time. I serve as a Project Manager on that development,
6 that plan, and got to know it fairly well, and then, in
7 2008, the full Commission adopted the plan after, again,
8 lots of -- I think we had something like 40 workshops and
9 over 500 stakeholders engaged and quite a few rounds of
10 review, so it was quite fully vetted and does provide a
11 strategic roadmap for energy efficiency through 2020.

12 As has been mentioned before today, there are
13 goals in the plan for new construction, as well as
14 existing homes. And for existing homes, the goal is to
15 reduce across California in existing homes, reduce their
16 energy use from the Grid by 40 percent by 2020, quite
17 ambitious. For existing commercial buildings, to see 50
18 percent of those become ZNE equivalent by 2030, to
19 optimize the HVAC industry across California and system
20 performance, and their saturation goal participation
21 goals for low income households. And the strategic plan,
22 unfortunately, was adopted by the full Commission just
23 after the utility submittal of their applications for the
24 current program cycle, but we did do our best to use it
25 to guide review and approval of the utility program, and

1 as Jordana talked about this morning, has since
2 instituted a number of action plans to maintain momentum
3 on the Strategic Plan. Next slide.

4 So just to get the big picture, again, there are
5 -- the top bar here lists the 12 statewide programs that
6 are common across the four utilities, and the lower bars
7 indicate the additional programs that are unique, either
8 what utility local programs are, it means just that one
9 utility has that individual program; third-party
10 programs, again, are mandated with local government
11 programs to comprise 20 percent of the budget, so overall
12 there's 113 third-party programs approved, and overall in
13 terms of state and local programs, there is over 80
14 individual either local governments or state institutions
15 that are participating and using ratepayer funds in a
16 program through one or more utilities.

17 And so part of the 12 statewide programs, many of
18 these were either modified slightly, or introduced as a
19 result of the strategic plan this last program cycle, so
20 in the industrial programs, there was a new continuous
21 energy improvement pilot that was introduced this program
22 cycle as a result of the strategic plan. There is a
23 significant overhaul of the HVAC Program that I'll
24 discuss a little later. Emerging Technologies and Codes
25 and Standards had several new sub-programs developed and

1 are being implemented this program cycle. And Marketing,
2 Education and Outreach had a new brand developed.
3 Workforce Education and Training had a new needs
4 assessment that was recently completed in that area, and
5 then the IDSM Lighting Market Transformation arms new
6 programs this program cycle. So there's a total of these
7 12 programs, there's a total of 44 sub-programs because
8 each program -- each of the 12 areas has a number of sub-
9 programs or program elements that comprise it. So now
10 it's about 265 programs which we oversee, which gives you
11 an indication of the complexity that we're dealing with
12 here. Next slide.

13 And I'll just add that the statewide programs do
14 comprise about two-thirds of the overall portfolio
15 budget. So it's quite a large part. This indicates the
16 budget breakdown by market sector, so our residential is
17 about 25 percent and commercial about 30 percent, with
18 the HVAC, which straddled both sectors at another four
19 percent. In the other category, again, it would be
20 Marketing, Education and Outreach, Workforce Education
21 and Training, IDSM, Lighting Market Transformation, and
22 EM&V.

23 So far as savings on the residential side for
24 kilowatt hour savings, res programs are saving about 33
25 percent, with commercial saving about 30, and therms

1 savings are dominated by industrial programs at about
2 half of therms savings with commercial at about 20 and
3 residential programs coming in just above 10 percent of
4 the therms savings. And some of these figures are at the
5 end of this Powerpoint for reference, so you can access
6 it online later if you're interested. Next slide,
7 please.

8 So just as kind of a benchmark, for the evaluated
9 savings for the last program cycle, in the therm area of
10 space heating, it comprised about 35 percent with water
11 heating about 45 percent. And in the kilowatts, the
12 demand side, the air-conditioning end use led to just
13 over 35 percent of the savings with indoor lighting at
14 about 54 percent. So these are the evaluated savings and
15 give some idea of what we can expect for this current
16 program cycle. Next slide.

17 Okay, Residential Buildings. That's a \$718
18 million total budget for the three years, there are eight
19 sub-programs, and I've just grouped them into five areas
20 here. So the first two sub-programs are what is called
21 the HEER, Home Energy Efficiency Rebates, and MFER,
22 Multi-Family Efficiency Rebates, that comprise 31 percent
23 of the residential budget and deliver your basic rebates
24 on appliances, furnaces, etc., as well as the contractor
25 led installation of appliances and heating systems and AC

1 systems, and light bulbs, etc., in multi-family
2 dwellings.

3 The basic CFL in advanced lighting upstream buy-
4 down programs together comprise 22 percent of the budget
5 with basic CFL Programs totaling 10 percent of the Res
6 budget and just two percent of the overall budget, and
7 Advance Lighting consists of various rebates for light
8 bulbs beyond basic spiral CFL's, so specialty bulbs,
9 dimmable bulbs, small socket screw-in bulbs, etc., and
10 getting into LEDs as we go on here a little bit.

11 Electronics Program is about 6 percent of the Res
12 budget and that's a program where the utilities work with
13 the manufacturers and retailers to provide upstream,
14 midstream buy-downs of the price, and do in-store
15 training, and provide point of sale information in the
16 retail outlets. There's also the Home Energy Survey
17 Tools, this service can be performed online by phone or
18 in person, and some of the budget for that program this
19 year is about five percent of the total res budget, is
20 being used to upgrade those surveys to perform integrated
21 assessments, so, for instance, an online user can
22 estimate the cost of adding a PV system with and without
23 efficiency upgrades under the new integrated demand side
24 tool that will be available next year through all four
25 utilities.

1 And then Energy Upgrade California, as Bill
2 mentioned, is a comprehensive whole house improvement
3 program, about 15 percent of the budget. And I'll talk a
4 little bit more about that later.

5 So, the additional third-party and local utility
6 programs, about almost 25 percent of the budget, and one
7 of those, for instance, is the Online Buyer's Guide that
8 Edison will be launching in just a few months, I believe,
9 and will be expanded to the rest of the utilities by the
10 end of the program cycle, is the goal. That will provide
11 specialized information for consumers to make the
12 smartest choice for appliances online. And again, there
13 is the stats on the res program overall. Next slide.

14 And so, the Energy Upgrade California Program is
15 new this year, combining the local utility performance or
16 advanced budget, as well as the statewide basic or
17 proscriptive budget, it's about \$116 million overall for
18 the four utilities for this program. Most of that is
19 going to incentives and, of course, program
20 administration, quality assurance, rebate processing, and
21 some small amount for marketing and outreach. The total
22 budget for marketing and outreach across the utilities
23 was capped in the last portfolio decision at 6 percent of
24 the total budget, and that has affected the marketing and
25 outreach available for this and other programs.

1 So the utility budget for this program, for the
2 basic path, was a budget approved at a level that would
3 allow for treatment of some 42,000 homes over this
4 program cycle, so we're ramping up, the utilities are
5 ramping up, not quite at that target yet, but have that
6 amount in the budget at the basic incentive level. The
7 single family effort got launched in October of last year
8 and San Diego Gas & Electric has been working closely
9 with HMG, the City of San Diego, and County of San Diego,
10 and some others that have some ARRA funds and that
11 basically is a multi-family Energy Upgrade California
12 Whole Building pilot has already begun with those ARRA
13 partners, and San Diego Gas & Electric will be providing
14 incentives to that effort shortly.

15 We have been working closely with Energy
16 Commission and the other local governments and utilities
17 and private sector on the Energy Upgrade California
18 program and, through a Commission decision adopting the
19 program, the effort is directed to be consistent with the
20 Home Energy Rating System. Next slide.

21 And we'll see -- is Jordana Camarata unmuted and
22 able to join us?

23 MR. STRAIT: I can unmute, one second.

24 MS. FOGEL: Okay, super. As you heard this
25 morning, Jordana is our Commercial Sector Analyst and

1 she's going to talk about the Commercial Programs here if
2 we can get her unmuted.

3 MR. STRAIT: All right, Jordana, I believe you're
4 unmuted now. Can you speak?

5 MS. CAMARATA: Yes. Can you hear me?

6 MR. STRAIT: Yes, we can hear you.

7 MS. CAMARATA: Great, okay. So I'm going to
8 quickly go over the Commercial Programs for Existing
9 Buildings. On the slide, you can see we've got Non-
10 Residential Audits, this program is a non-resource
11 program and it provides technical assistance and cost-
12 effective calculations through three different types of
13 audits. There is a basic audit, an integrated audit, and
14 a retro-commissioning audit. The integrated audit is the
15 new, I believe it is a new audit, an on-site audit,
16 performed by the utilities, and it gives you
17 recommendations on energy efficiency, demand response,
18 and distributed generation measures, and then there's
19 also this retro-commissioning audit which identifies
20 opportunities to optimize existing buildings, operational
21 deficiencies, and system performance. Then there is the
22 Dean's Incentives Program which is a basic rebate program
23 for the installation of energy efficiency measures.
24 These measures have a fixed incentive amount per unit, or
25 per measure. Typical measure categories including

1 lighting, air-conditioning, food service equipment,
2 refrigeration, there's a long list of that. Then,
3 there's calculated incentives, and that incentive program
4 is based on whole building, or whole system modeling, and
5 it includes technical and design assistance for
6 customized and integrated energy efficiency demand
7 response projects and retro-commissioning projects. It
8 considers system and resource interactions and also looks
9 at pushing the envelope with and including emerging
10 technologies.

11 The fourth sub-program is more of a pilot effort
12 for the utilities, it is a Continuous Energy Improvement
13 Program. This is also a non-resource program and it
14 provides comprehensive strategic energy planning and
15 consulting services for mostly large and industrial
16 customers. It has long term strategic energy planning,
17 corporate wide energy management, and provides a bunch of
18 other type of benchmarking tools, as well.

19 And then the last sub-program is the Direct
20 Install Program, and this is free or low-cost energy
21 efficiency hardware retrofits and it's mostly geared
22 towards small businesses, and delivered through third
23 parties.

24 And then, in addition to that, as you can see,
25 there's also a lot of local utility programs, and then a

1 lot of third-party programs for the commercial sector,
2 and they target niche markets such as hospitals and
3 lodging and schools and office buildings, and a bunch of
4 other things, as well. And these third-party programs
5 represent about 40 percent of the commercial budget, so
6 it's quite a bit, and that was actually a directive
7 during a previous decision to kind of expand third party
8 implementation.

9 And the last bullet here, you can just see that
10 about 30 percent of electric savings comes from
11 commercial, 22 percent of gas, and it represents 30
12 percent of the entire budget as a whole. And that's it.
13 Thanks.

14 MS. FOGEL: Great, so I'm --

15 MR. PENNINGTON: Cathy? This is Bill. Could you
16 take maybe three or four or five minutes more and finish?

17 MS. FOGEL: Sure. I'll skip through the HVAC
18 side pretty quickly. What I'll just say -- next slide --
19 is one of the new sub-programs developed last year by the
20 utilities is the HVAC Quality Maintenance Program and it
21 was developed in coordination with the Western HVAC
22 performance Alliance and so it's commercial and
23 residential oriented. The commercial program is based on
24 the ASHRAE, ACCA, and C Standard 180, establishes minimum
25 inspection and maintenance requirements, and it takes

1 kind of a predictive preventative approach rather than a
2 reactive approach and puts in place three-year quality
3 maintenance service agreement, and we can provide more
4 information if anyone is interested.

5 The Residential Quality Maintenance Program is
6 going to be based on the ACCA Standard 4 and establishes
7 minimum inspection requirements for HVAC maintenance
8 equipment in one family and two-family dwellings, three
9 stories or less, and it's providing a one-year quality
10 maintenance service agreement and it significantly
11 expands the maintenance activities performed during
12 visits by the qualified contractors. Next slide, please.

13 So just briefly, this is a new brand launched
14 this year. Many of you will have heard of it, it's based
15 on extensive research, has a website, and I just mention
16 it because it is so important, marketing and outreach, to
17 any kind of market transformation efforts. Next slide,
18 please.

19 And so, just to recap, talking about market
20 transformation programs and groups of programs, aimed at
21 really transferring the market rather than getting
22 savings immediately from individual consumers or
23 buildings, the strategic plan has many strategies, we've
24 talked about before, and that you heard Bill talk about
25 in terms of the mandates for AB 758, it calls for the

1 establishment of whole house programs for increasing
2 consumer demand through home rating and labeling
3 approaches, and requirements, behavior change and social
4 marketing approaches, and calls on local governments to
5 establish residential energy conservation ordinances. It
6 talks about the need to develop new financial products
7 and, just to note, the CPUC did just release a finance
8 report across the market sectors last week; if anyone
9 wants to see it, contact Jordana and I, and we'll be
10 holding workshops on that a little bit later this year.
11 It talks about the importance of improving compliance and
12 addressing plug loads. And Jordana talked about earlier
13 Codes and Standards improvements are called out,
14 benchmarking and building labeling, you know, financial
15 products, and rewarding comprehensive retrofits. So the
16 point is, there's a very strong basis in this energy
17 efficiency strategic plan for AB 758 activities. Next
18 slide, please.

19 So one of the challenges we face is ensuring the
20 continued cost-effectiveness of the utility portfolio
21 with a number of these newer approaches and additional
22 non-resource programs generated by the strategic plan.
23 Over the last nearly 12 years now, the average portfolio
24 TRC has been declining, so that's a big challenge for us
25 and, as we think about how to direct the utilities to

1 undertake more market transformation activities, or how
2 those activities might be funded using ratepayer funds.
3 Next slide, please.

4 So keeping the portfolio cost-effective, our
5 savings that comprise these estimates, are based on the
6 valuations and those, in turn, are drawing on the DEER
7 database. This is heavily litigated, the ex ante values
8 for the current program cycle are still under litigation
9 between the utilities and the CPUC, so it's a major
10 challenge for us. Procedural requirements, I mentioned,
11 portfolio guidance decision in less than a year to
12 provide guidance for the '14 through whatever it will be,
13 '17 or '18, maybe, program cycle. So we've got a lot of
14 procedurally -- very challenging to get this guidance
15 into the CPUC record in that time, and have that guidance
16 be based on new information from ARRA programs, or any
17 new information that comes from the AB 758 Needs
18 Assessment.

19 An opportunity -- CEC-CPUC coordination, we've
20 done a lot of it over the last year and we'll be doing
21 more of it, so it's challenging with limited staff
22 resources, but so necessary, so it's really the
23 foundation for our efforts to go forward here. And AB
24 758 will provide some focus through the Needs Assessment
25 and the mandate given to the Energy Commission and some,

1 but not a whole lot, of additional resources. And of
2 course, the momentum and the ideas that will come from
3 the market actors through all of this will be very very
4 helpful and important in moving California forward. I
5 think that's my last slide, so thank you very much for
6 your attention.

7 MR. PENNINGTON: Thank you very much, Cathy, it
8 was very good. Hopefully, you'll be around after the
9 next presentations for questions?

10 MS. FOGEL: Yeah, I'll be able to stay on the
11 line.

12 MR. PENNINGTON: Okay, thank you. So our next
13 presenter is Eliot Crowe. Eliot is a Senior Program
14 Manager at PECI. He has over 15 years of Engineering
15 Project Management experience. He's managed the Southern
16 California Edison Retrocommissioning Program, which has
17 had more than 80 Retrocommissioning projects. He's
18 currently managing a \$2 million PIER Research Program to
19 develop best practice guidelines and tools to support
20 Retrocommissioning, and improving the Non-Residential
21 Building Energy Efficiency Standards Code Sections
22 related to acceptance requirements and compliance with
23 that. He's also overseeing the day-to-day activities of
24 the California Commission as a member of PECI. He will
25 be actively leading the Non-Residential portion of the

1 technical support activities for AB 758. So, Eliot.

2 MR. CROWE: Thanks, Bill. The main focus of the
3 presentation that I'll be giving here and also in
4 partnership with Nehemiah is going to be around the Needs
5 Assessment portion of AB 758, and we'll start by giving a
6 bit more of a general --

7 MR. PENNINGTON: Sorry, you need to speak up.

8 MR. CROWE: I'm too tall, I need to crouch down.
9 So I'll be focusing on the Needs Assessment portion of
10 the program, which is the earliest part of AB 758, but I
11 will give a little bit of context and some of the
12 background information as a lead-in.

13 The current state of progress is that we have a
14 couple of work authorizations under review and we're
15 expecting these to be approved very shortly, but the
16 first focuses on the Non-Residential Needs Assessment and
17 the Building Energy Asset Rating System that Bill
18 referred to in his introduction. And we've been working
19 with a number of people at the Energy Commission to put
20 these work authorizations together, Devi Eden, Becky
21 Menten, Bill, Eurlyne Geiszler, Martha Brook, and Justin
22 Regnier have all been very instrumental in putting this
23 work package together. And on the Residential side, we
24 also have a Needs Assessment as the first fundamental
25 piece of that work, HERS improvements, affordable housing

1 initiatives, and looking to improve compliance
2 enforcement, which is what Nehemiah will be covering in
3 his portion of the presentation.

4 These two work authorizations, as I say, are due
5 to start soon and will run through the middle of next
6 year where we hope to really lay the groundwork for the
7 phases of the program.

8 Given the very broad scope of AB 758, we've
9 assembled a pretty broad range of experts to work on the
10 program. PEGI will be the prime contractor to the Energy
11 Commission, and working with us on both the residential
12 and non-residential sides are a team of crack experts. I
13 won't read them all off, but you can all see that the
14 breadth of experience we have there, and also in addition
15 to the specialist residential and non-residential
16 technical experience, we also have some outreach and
17 field support to really, you know, engage with the market
18 out there where we're actually trying to see the
19 difference is made.

20 The schedule for the Needs Assessments, we're
21 going to be running through the end of this year and the
22 outcome of that will be to develop an action plan for the
23 program out of which will fall numerous other work
24 authorizations to take the program forward. The key
25 tasks include interviewing 15-20 stakeholders and we're

1 certainly open to suggestions on who would be the key
2 people that we should obtain input from. We have a lot
3 of expertise within the team, we can tap into a lot
4 within the Energy Commission, but we're looking to engage
5 with the market and really pull in what's needed and
6 separate out what's currently being offered, what is
7 currently planned to be offered, and Cathy and Jordana
8 gave a really great account there of the wide range of
9 services being offered through the CPUC and the
10 utilities. And we're looking to complement that with
11 this work here.

12 Another part of the Needs Assessment will be some
13 secondary research into market data, just trying to slice
14 and dice the market for Residential and Non-Residential
15 in terms of where energy is used, breaking it down by
16 sector and other demographics, to identify potential gaps
17 in what is currently being offered, and also the areas of
18 the greatest potential in terms of energy use and
19 savings.

20 Another key part will be identifying the success
21 metrics, how we're going to actually judge the
22 performance of the program, itself, a really key step at
23 the start of the program here, and I do have a slide on
24 that a little bit later in the slide deck.

25 Another key part will be a series of public

1 workshops. Today isn't officially one of those public
2 workshops within the scope, but we're very interested in
3 convening meetings like this to obtain feedback from all
4 sectors of the industry.

5 Referring to the metrics, measuring success here,
6 we've kind of made a start here. As I say, we're not
7 fully in contract work authorization mode, but just
8 starting off instinctively, you have a sense of how we're
9 going to measure the success, and that's going to be in
10 terms of contribution to the Zero Net Energy Goals, how
11 we're able to transform the market in partnership with
12 the CPUC and other market factors. The Needs Assessment
13 is likely to identify a number of barriers to increasing
14 the overall energy efficiency of buildings, and we need
15 to find a way to measure our success in overcoming those
16 barriers. Having a qualified work force is critical, we
17 need to make sure we can measure the progress in that
18 area, also. And financing mechanisms and products will,
19 we think, also be instrumental in improving uptake of
20 offerings through the utilities and other areas.

21 Rating and Disclosure Programs is a really
22 fundamental early part of the infrastructure and, again,
23 you know, in measuring ratings, you can also measure
24 improvements in ratings, so that will be a big part of
25 our assessment of the program as we go forward, how

1 people are taking up the ratings and disclosures, and how
2 effective those ratings and disclosures are in actually
3 promoting improved energy efficiency.

4 So, specifically now on the Non-Residential side,
5 I'm going to just break down some of the areas in the
6 Needs Assessment that we will be looking at, it's not an
7 exhaustive list, this is why we need to really tap into
8 the industry experts to tell us where the gaps are, where
9 the biggest opportunities are, where the biggest areas of
10 needs are. But just within the team and within the
11 Energy Commission, we have a starting laundry list that
12 we're going to use to develop interview instruments for
13 those experts.

14 Financing is obviously a very big area on both
15 Non-Res and the Residential, and we're going to be
16 seeking the gaps out that will be new tools that motivate
17 commercial owners and enable them to make the finance
18 upgrades, and this may be an area where we look in
19 different sectors in a different way than maybe some
20 sectors where there are lots of financing products held
21 there, but they're just not well utilized, and other
22 areas where there just simply aren't the products
23 available. But certainly, municipal financing and
24 utility on-bill financing are both established as
25 offerings and, as I say, some of those are well utilized,

1 and some are less well utilized, we're going to look for
2 the causes of those things.

3 We will obviously be leveraging some of the work
4 recently completed, and Cathy did make reference to the
5 CPUC's recent report on workforce requirements, and you
6 know, in general terms, we're going to have to look out
7 for these kind of publications that come out all the time
8 and how they relate to the AB 758 work. One of the key
9 documents that we're talking around today is the CEC's
10 recently released report, which can be downloaded
11 alongside the Meeting Notice for today's meeting.

12 Specifically on the Work Force Development, then,
13 we're talking about adding the asset rating and
14 disclosure programs. We'll need workforce to actually
15 meet the demand to provide the services and to provide
16 those ratings. And then, subsequently, when the owners
17 get really excited about making their energy upgrades,
18 we're going to need an in-house workforce to support
19 that. And there's a lot of work already going on through
20 the ARRA funded programs in the state, and you know,
21 we'll be looking through the Needs Assessments to assess
22 the performance of those programs, what needs are being
23 met, and what are the market sectors perhaps next in line
24 to receive that kind of workforce training.

25 The Rating, Disclosure and Efficiency Programs,

1 this is -- certainly rating and disclosure is a really
2 hot issue internationally, nationwide, in the state, AB
3 1103 is one precedent for a rating disclosure initiative,
4 and we see this as a crucial leverage point to actually
5 have people understand what they have in terms of their
6 building performance and the potential in their building
7 to be efficient, and to use that as a way to convince
8 them that they can make improvements to build off of
9 that, and actually make improvements in their building
10 rating. And there's a lot of research out there that
11 links building performance to building value, which is a
12 great boost to people's uptake in this kind of work. And
13 there are a number of national initiatives going on, DOE
14 is working on a national asset rating; ASHRAE has the
15 Building EQ, which is currently being piloted; COMNET is
16 a nationwide organization that's really looking at the
17 modeling foundations for asset ratings. ASTM has
18 recently published some disclosure-related standards, and
19 there are a number of local requirements statewide,
20 citywide, that are requiring disclosure, whether it be
21 public or simply within a transaction, and also some
22 going beyond that to talk about regular energy audits,
23 etc. So there is a lot of work going on in this area
24 and, to some degree, California will be looking to align,
25 and to another degree it will be looking to take the lead

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 and really push things forward.

2 And the Building Energy Asset Rating System is
3 something which will certainly be looking to start work
4 on in parallel with the Needs Assessment. I think it is
5 so strongly identified as a need that we don't need to go
6 out and talk to the experts to convince ourselves it's
7 necessary, but we'll certainly be looking to find the
8 experts who can provide the input on making it the most
9 successful it can be.

10 In terms of the programs, themselves, which
11 really, I think, as Bill's phased plan presented, is
12 maybe the Phase 3 of the Program. We'll be looking to
13 work very close to the CPUC in evaluating the programs
14 that are offered, seeing where the gaps are, and seeing
15 how the AB 758 Program can really support that work and
16 increase uptake.

17 So that concludes the general intro and the non-
18 residential side of things. I'm going to hand over to
19 Nehemiah to cover the Residential side of AB 758.

20 MR. PENNINGTON: So the next speaker here on the
21 panel is Nehemiah Stone. Nehemiah and I go way back; he
22 thinks it's 22 years, I'm not sure I agree with that. But
23 basically he's done a variety of things. We're to the
24 point of working together so closely that usually we just
25 dispense with the niceties and start arguing just at the

1 outset, you know.

2 MR. STONE: Habit.

3 MR. PENNINGTON: But he's done a variety of
4 things related to Energy, he's been a licensed
5 contractor, he's worked for a Building Department as a
6 Plan Examiner and a Building Inspector. You all remember
7 that he was the staff lead at the Energy Commission in
8 1992 when we developed residential building standards
9 that aggressively went after windows. After leaving the
10 Commission, he's worked as an Efficiency Program
11 Implementer for various companies, worked on Evaluation,
12 Policy work, and Building Science Research. He's a
13 principal with the Benningfield Group, and he also is the
14 Residential Lead for the AB 758 Contract, the Technical
15 Support work we're going to do. Nehemiah.

16 MR. STONE: Thank you. The point of what he was
17 just saying, that I've been ankle deep in probably about
18 more than half of the professions that you folks have and
19 any topic that comes up, there's somebody in the room
20 that knows worlds more than me, but I at least know how
21 it relates to all the other topics because I've been
22 ankle deep there.

23 One of the slides that I don't have here in the
24 Residential section because it was -- Eliot covered it in
25 the overall -- was the Needs Assessment, but that's

1 actually the thing I'm going to talk about the most. All
2 the rest of the slides here relate to what we plan to
3 learn about in the Needs Assessment, so I'm going to give
4 you just a little bit of background, the process on the
5 Needs Assessment, and then you won't see slides on the
6 Needs Assessment, but all of this relates to what we're
7 going to be doing in that.

8 So there's a number of steps that we're going to
9 be going through, creating a survey instrument and
10 talking to a couple dozen folks from different aspects of
11 the industry on the topics that make a difference on
12 where we are on trying to get, where AB 758 wants us to
13 be. As Eliot said, the end goal of that is to come up
14 with a plan on how we get there, and that's what the
15 Commission asked to do at the end of this whole process,
16 and that plan is not just a plan for what we're doing
17 during the iteration of this contract, but it's a plan
18 for how to get to the goals for 2020 and 2030. It's a
19 plan for how to get a much deeper energy efficiency in
20 the existing stock.

21 So, in addition to having the interviews, we're
22 also going to be delving into market data that's out
23 there. There's a lot of different sources, CIRB,
24 Department of Finance, NAHB, you know, all the different
25 associations that are involved with building the housing

1 stock we have, with managing it, owning it, doing the
2 upgrades to it, all of that. And we're going to assess
3 that data. We're not going to go out and do fundamental
4 new research on what's going on in the market, we're
5 going to be assessing all of the research we can find
6 that says what is out there, what the opportunities are,
7 what the barriers are.

8 The next step is developing a Preliminary Action
9 Plan for the Commission. And this is something that
10 we're going to be doing very interactively with the
11 Commission staff, and the end result, this is the
12 Commission's plan, and as the technical consultants we
13 will help to write the plan, but it's going to be very
14 interactive work on that. Then comes the workshops that
15 Eliot talked about, and those are the opportunities for
16 folks around the state, to see what it is that we're
17 preliminarily looking to do, and give us constructive or
18 not so constructive advice and input on it, and help the
19 Commission understand how that plan is going to affect
20 the different industries it has to affect and what those
21 industries think about how to make the progress towards
22 deeper energy efficiency happen smoother and more
23 certainly. After assembling that, then we will work with
24 the Commission to develop the final Residential Action
25 Plan.

1 Now, that's the first piece of what's in the
2 Residential Work Authorization that's under review right
3 now and which we expect very shortly. Part of the intent
4 of that Needs Assessment was to help us figure out what
5 exactly to write in the work authorizations for all the
6 other tasks. Because of timing, and because a lot of
7 this work has to be wrapped up by next spring, we are
8 actually going to be working on a few things
9 concurrently. We're not going to be getting to the
10 conclusion of anything else before the Needs Assessment,
11 and as the Needs Assessment progresses, it's going to
12 inform us on the other tasks, but we don't have the
13 luxury of waiting to start on everything else until after
14 the Needs Assessment is done. We simply cannot get to
15 the finish line in time if we do that. So one of the
16 other areas -- well, I'll get to that in a moment. So,
17 the Needs Assessment will be looking at a number of
18 different things that impact how the various industries
19 involved will be able to get the deeper energy efficiency
20 in the existing residential market; workforce
21 development, obviously, is a big piece of that and,
22 starting at the bottom here, one of the things we're
23 going to be leveraging is a report that U.C. Berkeley did
24 in concert with the Energy Commission and PUC, evaluating
25 the Workforce Education and Training Needs Assessment,

1 they actually started it before the AB 758 mandate, but
2 it was very much informed by that and was just completed,
3 if I'm not mistaken, within the last couple months.

4 So the ideas are to create a sustainable
5 workforce, and this means making sure not only that you
6 have enough people, but that you're not educating too
7 many people in the wrong bucket, that are not going to be
8 able to find work, and therefore, you know, taint the
9 whole thing with sour grapes, if you will. Meeting the
10 demand for all the services that have to happen, you
11 know, it's not enough to go out and figure out what has
12 to be done to a building, you have to have qualified
13 people able to do it and verify that it was done
14 afterwards. An awful lot of programs rightfully require
15 that you have certifications to establish what your
16 qualifications are, to take part in that whole process.
17 So that's a critical element, in understanding what
18 certifications are out there, what the needs are in the
19 areas of certification, and what the capabilities are.

20 An assessment of whole house training vs.
21 specialized training, there's a lot of projects where --
22 and I've actually on one iteration of this slide deck, I
23 changed it and somehow I didn't on this one -- whole
24 building training. My focus is actually multi-family.
25 So when we talk about Residential, I try to remind people

1 that people live in -- people reside in multi-family
2 buildings, too. So it's a whole building perspective,
3 rather than whole house. But, anyway, there are some
4 projects where that is the best way to approach it, is to
5 look at the whole building, figure out everything you can
6 do at once, and get it all into the loan for the
7 refinancing package that's going to happen at that time.
8 There are other projects where, for one reason or
9 another, that's not possible. It's absolutely not
10 possible. And so the best approach on those is to pick
11 off those things that can make the biggest difference
12 that you can afford, and that are not going to put
13 something, a blockade in your path towards getting deeper
14 efficiency later. Training needs to be provided on both
15 of those tracks so that we have people who can fulfill
16 those roles all the way down the line.

17 Rating and Disclosure Programs, it's very similar
18 to what Eliot was talking about, but with some other
19 nuances. There are a couple programs out there, three
20 programs out there right now that are important to look
21 at and compare among each other so we can figure out what
22 the advantages and disadvantages of each of them are, and
23 what the capabilities are for each of them. One,
24 obviously, is the California Energy Commission's HERS 2,
25 the programs developed under the HERS 2, another is DOE's

1 Home Energy Score, and another is Energy Trust Energy
2 Performance Score. Most other states are looking at
3 DOE's home energy score. I am not sure of the state of
4 decision for any of them, but what it means is that, in
5 California, even though we've made a commitment to HERS
6 2, it is important for us to look at HERS 2 in light of
7 what DOE Home Energy Score Program does and doesn't do,
8 and what its capabilities are.

9 We also have up in Oregon a fairly successful
10 program in providing disclosure on properties as to what
11 their energy use is. I don't know what all the
12 capabilities are of that, they may not be able to be in
13 the right program for looking at identifying what all the
14 right opportunities are, and then being able to rate the
15 building before and after. But we need the ability to
16 tell somebody who is about to make a decision, whether
17 it's a purchase decision, or whether it's a rental
18 decision, what the cost of having that residence is, and
19 that cost has been focused almost exclusively in the past
20 on the cost of the mortgage, the cost of making the
21 payments, or the cost of the rent. And it's not a
22 complete decision, it's not an educated decision, as John
23 said earlier, if you don't also have information on what
24 does it cost to maintain that building -- what is it
25 going to cost me for electricity, for gas, for water?

1 We're going to be looking at financing and, on this,
2 obviously the heavy lifting has already been done by the
3 PUC, the contractor, and the report that just came out,
4 "Energy Efficiency Financing in California: Needs and
5 Gaps." But there's a lot of specifics around residential
6 financing that we're going to have to document, and
7 highlight in the report. And there's a plethora of
8 financing instruments in the residential sector, at least
9 in the single family residential. The problem there is
10 probably not that we don't have the right instrument.
11 One of the biggest problems is that there's a
12 discontinuity across the different financing instruments
13 so that they may have different descriptors, or they may
14 have different requirements, and for a lot of projects
15 you have to access more than one financing instrument at
16 a time, and this is clearly true for affordable multi-
17 family, most of those projects have at least seven
18 different financial instruments involved in it before
19 they even can break ground. So, making sure that there
20 are not barriers put up in one financing instrument, that
21 means you can't use the other ones, or identifying where
22 those barriers are so that solutions can be identified as
23 part of it.

24 There's some innovative ways of getting at
25 financing that are not what people typically think of as

1 financing for energy efficiency, and I just put one
2 example up here partly because I was very involved in it,
3 and that's getting the utility allowance correct when
4 you're going after low income housing tax credits for
5 affordable multi-family projects. It doesn't look like a
6 financing instrument, but it absolutely is because if you
7 have to estimate what the tenants are going to pay for
8 utilities based on old buildings that use a lot more
9 energy than your energy efficient building, then that
10 means that, by the calculations that you have to do,
11 you're subtracting a lot more from what you could charge
12 for rent for those than you actually should because the
13 tenants will be paying a lot less for their utilities
14 than the calculation says. Well, the California Utility
15 Allowance Calculator, CUAC, or as it's fondly called "the
16 Quack," solves that problem. It gives you a much more
17 accurate estimate of what the tenants will be paying.
18 And so, what it means, then, when you go to Bank of
19 America, or anybody, what you're showing them is you have
20 the ability to handle -- to service a lot more debt, and
21 it becomes, then, a financing instrument. There's other
22 innovative examples like that, but Bill would probably
23 cut me off if I try to go into too many of them.

24 So we'll be looking at potential opportunities to
25 expand the use of the CUAC, and this is very specific,

1 this is not an example, this is one of the tasks that
2 we're going to be doing is finding a way to have the
3 California Utility Allowance Calculator apply to a larger
4 range of projects. Right now, it only applies to low
5 income housing tax credit and new construction projects.
6 Well, it should apply to - if we get everything in as far
7 as quality control in line, it should also apply to
8 Redevelopment Agency projects, so assuming there's any
9 Redevelopment Agencies going forward. It should apply to
10 other local government funded projects, or HUD funded
11 projects, or any other projects that -- I just lost all
12 my notes, oh well, extemporaneous -- any other projects
13 that have a utility allowance involved in it. So one of
14 the tasks here is to work with local entities to try and
15 find a way to make sure that the quality control can be
16 implemented at the local level.

17 One of the other things that's going to come out
18 of this is working with some of the incentive programs
19 that are out there to try out new strategies for getting
20 deeper penetration into the existing residential market
21 and getting deeper energy efficiency gains from those
22 individual projects. There was consideration initially
23 about having pilot programs, but rather than try to
24 create a program and compete with the ones that are out
25 there, what we're going to do is we're going to work with

1 the programs that are out there, and get them to pilot
2 different innovative efforts within those programs to see
3 if we can find a way of increasing penetration and
4 increasing efficiency gains.

5 And one of the other big tasks is Codes and
6 Standards compliance improvements, and there's a couple
7 main areas under this, 1) we need a comprehensive
8 understanding of what all is happening, what all is going
9 on, to try to improve compliance. We need a full scale
10 picture of who is doing what, how is it working, you
11 know, what specific barriers at trying to get to -- Pat,
12 I'm going to borrow something from Jill here -- it's
13 somebody that I have been working with for quite a while
14 and I really enjoy working with, once said something in a
15 presentation like this that I've used over and over and
16 over again, and that is that training -- and I'm going to
17 get this wrong, she corrects me every time I say it - but
18 it'll be close -- training is the right answer when lack
19 of knowledge is the problem, but we all too often assume
20 lack of knowledge is the problem, so we do more and more
21 training programs for people in Building Departments and
22 HERS folks and contractors, and subcontractors, and it's
23 not always the problem. Sometimes it's a different
24 problem that we have to solve, and so we need a range of
25 compliance improvement efforts, and they need to be

1 targeted to the specific barriers that are there.

2 The other major piece that's in that is that
3 California is committed, as have the other 49 states, to
4 getting -- and correct me if I'm wrong on this, Bill,
5 about the number -- but getting to 90 percent compliance
6 by 2017. Now, I'll wait for a moment while the laughter
7 dies down, okay, no it's supposed to die down here, okay,
8 all right, so the point is that, you know, if I asked
9 everybody in the room individually what percent
10 compliance do we have now, I'll bet you I'd have at least
11 one more answer than I have people in the room. We don't
12 know at this point. We have a scad of estimates and I
13 haven't seen two estimates that are close to each other,
14 so one of the things we need to do is to help the Energy
15 Commission in its role of coming up with a baseline and
16 coming up with the right metrics to measure improvement
17 against that baseline. There's no way in heck that we
18 can say, by 2017, we've gotten to 90 percent better,
19 unless starting off we knew where we were, and we know
20 how to measure what that improvement is.

21 There's a number of different efforts and
22 different places of doing something like this.
23 California, we're going to have to do it differently,
24 surprise, surprise, because we approach the standards
25 differently. In most of the rest of the country, their

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 standards are proscriptive and you'll do this, and this,
2 and this, and this, and folks, it's really easy to figure
3 out how many people are doing what and how that changes
4 over time if all you have to do is look at a menu and
5 figure out, okay, did you do this, and this, and this,
6 and this? In California, most compliance with the
7 Standard is performance-based. If it's performance-
8 based, you can't tick down a list of widgets and say,
9 "All right, here's where we are." And so it is more
10 complex, it's going to take time to figure it out, and
11 it's going to be a different system, almost certainly,
12 than what the rest of the country uses. I think that's
13 it.

14 MR. PENNINGTON: Okay, thank you very much.
15 Panelists, I think at this point we're going to turn to
16 questions and I've got a few questions here. I think,
17 missing the morning, I'm not sure I'm following the
18 pattern of the morning, but I'm led to believe I'm
19 following the pattern by posing the questions to the
20 panelists first, and then opening that up for people in
21 this audience and people on the phone. So let me do
22 that.

23 In our IEPR Report recommendations, in the Draft
24 Report, we emphasize data driven policy. What design
25 support tools do you think we need to reduce barriers to

1 energy efficiency, demand, financing, and implementation?

2 So, would a panelist want to take that on?

3 MR. STRAIT: Let me really quickly step in - if
4 there is anybody on the phone that wants to jump in,
5 there is a "raise your hand" button that you can press,
6 that will let me know to unmute you and put you on the
7 line.

8 MR. STONE: Well, Eliot and I just arm wrestled
9 and I get to go first here. As I mentioned in the
10 morning session, which you missed, if we're going to --
11 the morning session was about getting to net zero, and if
12 we're going to get to net zero, the way we're going to
13 figure out whether we got there is we're going to have
14 models that can account for actually what's going on in
15 the building rather than models with -- and no offense to
16 anybody -- but models with no problems, that don't allow
17 you to see the real physics that are going on in the
18 building. So one of the things we need to do is we need
19 to have models where we can enter all the parameters of
20 the building, it will give us an estimate of what is
21 going on, and we can true it up to measure data. And the
22 best source to measure data right now is probably utility
23 bills. But there can be other ways of getting at it.
24 So, I think that the best track will be to pay a lot of
25 attention to what is in the algorithms in the new ACM and

1 be able to dynamically, on an individual project, be able
2 to go in and true it up so that when you're making
3 improvements down the line, you have a model that shows
4 you what's really going on in the building.

5 MR. PENNINGTON: Okay, thank you. Eliot?

6 MR. CROWE: I guess my answer does relate
7 somewhat to Nehemiah's. I think I have a lot of recent
8 experience looking at energy monitoring and system
9 monitoring, certainly on the commercial side, and I think
10 that is another crucial tool to provide everyone with
11 data that's beyond the monthly billing data, and to
12 really support -- I think a lot of initiatives are going
13 to hang off of that in terms of showing people what
14 energy they're using, and inspiring them to action. It
15 also supports a lot of Demand Response work. And also,
16 some of the pieces that were mentioned by Cathy and
17 Jordana around continuous energy improvement and whole
18 building approaches, I think that's going to be a really
19 crucial piece of that puzzle to support all these
20 initiatives, and also in terms of measuring impacts. If
21 the data is being monitored, it can be effectively
22 aggregated so that someone at a high level can see the
23 overall impacts statewide, it will be very powerful.

24 MR. PENNINGTON: Okay, thank you. Cathy, would
25 you like to respond?

1 MS. FOGEL: Can you hear me?

2 MR. PENNINGTON: Yes,

3 MS. FOGEL: Okay. Yeah, I agree with what's been
4 said and I guess I would add -- and I agree with the
5 recommendation from the Energy Commission -- I think what
6 I would add is that some of this data collection has
7 started with our Energy Upgrade California collaborative
8 effort, so we're collecting data on job cost and
9 projected savings at this point. I think we need more
10 data like that that's a little bit simpler than what the
11 other folks were talking about, but that can let
12 consumers know, you know, likely costs and benefits to
13 help get them interested. And a lot of this information
14 will feed into better finance offerings, we hope. And I
15 think just to maybe offer, you know, come out of the box
16 a little bit, we probably need some more data, better
17 data, on contractor training and especially worker
18 training levels, especially in a residential space where
19 so much of doing really quality work, which is necessary
20 to really achieve these savings, is done by workers often
21 with fairly limited training themselves, their crew boss
22 might have a training, or their contractor might, and
23 there's going to be QA, but we need to -- I think some
24 data on overall improvement of the skills level across
25 the contractor base in the residential sector would be

1 helpful in our efforts.

2 MR. PENNINGTON: Okay, thank you.

3 MR. STONE: Bill, can I add something real
4 quickly? One of the other things, if the decisions are
5 going to be data driven, the data has to be very
6 accessible and you have to be able to manipulate it in a
7 way that makes sense. And so one of the important things
8 is thinking through how you might possibly want to use
9 all the data, and then setting up the database, if you
10 will, in a way that you can do that. I guess the best
11 example is that the Public Utilities Commission and the
12 utilities has spent millions of dollars on EM&V, on
13 programs since the early '80s, and all of that data is
14 "available." But it's all -- it's essentially in PDF or
15 in Word, or in an Excel spreadsheet that doesn't look
16 like any other Excel spreadsheet, and that wealth of
17 data, I mean, that's an incredible value that we have
18 there, that really is not that accessible. And going
19 forward, we should think about, you know, if you're going
20 to be collecting this data, the kind of data that Cathy
21 was talking about, or data on how programs perform, data
22 on buildings that you monitor, any of that, there should
23 be a consistent format and a database that it all goes
24 into that you can dive into, you can figure out, you can
25 ask questions and get an answer based on data from six or

1 seven different research reports because their data is
2 all in the same format.

3 MR. PENNINGTON: Okay, thank you. Is there
4 anyone in the room that would like to address the
5 question? Yes, Mike.

6 MR. GABLE: Mike Gable, the other Mike. Yeah, my
7 concern is that, in this evaluation period of assessment
8 that you all kind of really look at the stakeholder
9 issues of a system of energy, if it's a home label, or
10 rating, or a commercial building rating, as sort of a
11 crucial puzzle with a lot of pieces, which I know you
12 alluded to stakeholder interviews, but that what drives
13 the bus in your needs assessment is that you've really
14 accounted for all the key players having that kind of
15 important input in what's going to work for them, and
16 I'll just briefly as an example, you know, I think I've
17 been involved with four local governments in the last
18 year or two, and you know, I think with HERS 2, there are
19 some issues we need to probably look at, but
20 understandability by the consumer, by the home owner, the
21 real estate community, whether there is a model that you
22 can get this on the MLS listings, I mean, there are all
23 these parts of it that I think, when we all sort of went
24 into the story out a few years ago, we weren't quite as
25 attuned to it as we maybe all should have been, and I was

1 part of this, too, and I didn't pick up on stuff, but
2 that we have this chance to kind of correct a lot of
3 maybe errors and decisions that were made, so I just want
4 to make sure all the stakeholders get really included in
5 these key points.

6 MR. PENNINGTON: Thank you.

7 MR. STRAIT: Bruce, you are live at the moment.

8 MR. KEESEE: Mike Keese, I'm with SMUD. I work
9 in Research and Development. The last couple of years,
10 I've been taking a look at the retrofit issue. How do
11 you achieve 50 percent plus savings in existing homes, 30
12 percent plus savings in existing buildings? I'm not sure
13 where my comments fit into what the discussion that just
14 happened. You can ask my opinions about HERS offline
15 because I think everyone should go through the process
16 personally to find out how frustrating and crazy it is,
17 because I get lots of different HERS values every time I
18 hit return on an energy product. I even get different
19 standards -- and Mike did them for me, and I get a
20 different number for my Title 24 addition compliance
21 standard budget every time I hit Return 2. Don't ask me
22 why. I think that's just the way it is. But this is
23 what I want to talk about, is opportunities. I think the
24 whole issue here is driven by consumer choice and
25 opportunities, and it's driven by financing. We all bet

1 the farm last year on a couple things, one was PACE. The
2 other was Home Star, if people remember that stuff. And
3 it was all the promise I saw, I went to an efficiency
4 conference with thousands of contractors, which was the
5 ACI conference in Texas and excuse me if I'm going on and
6 on, but there was real buzz in the conference about those
7 two things, they were going to make money. And if
8 contractors can get money, I think you've got something
9 going. But those things fell apart, and the whole key to
10 this, based on the six deep energy retrofits that I've
11 gotten for SMUD under our demonstration program to see
12 how you get to 50 percent savings in existing homes, was
13 predicated on opportunity. These homes were abandoned,
14 foreclosed homes. That's the greatest opportunity we
15 have right now, to do something on a scale, which is
16 going into the resale market and doing the improvements
17 there, a tool already exists, it's existed for almost 40
18 years now, and all of a sudden the market has got a buzz
19 about it. I mean, the real estate agency no longer is
20 opposed to trying to figure out the energy efficient
21 mortgage, at least locally. They're no longer opposed to
22 having a HERS rating done because they see the specter of
23 regulation breathing down their neck and nobody gets
24 religion better than if they think they're going to get
25 mandated about it. These are sort of my opinions of it,

1 and it's the easiest, best way to finance the saving, or
2 the improvement that needs to be done at the time of
3 resale because it's transparent to the buyer, they just
4 see a brand new house and better bills, and if they can
5 fold it into their mortgage, they don't care. Nehemiah
6 is shaking his head, I think he's with me on this.

7 And so the issue now is to pounce on the
8 opportunity, as slim as it's been, because we've talked
9 about energy efficient mortgage since my career started
10 20 years ago, it's never gone anywhere. But all of a
11 sudden, I think -- either -- there's a correlation, you
12 could do a study about that one, too. And then that
13 opportunity stretches, at least in the residential
14 market, to the other opportunities that exist. People
15 don't think about this, they think about, "Oh, my God, I
16 need a new roof." "Oh, my God, my air-conditioning
17 system broke." And if you can capitalize on those
18 opportunities and, again, refinancing may be the way to
19 do it because it's the best means of it, there's the 203
20 case streamline from FHA that exists. And I say this
21 because, you know, right now in this market, nothing is
22 happening, as we all know, with Energy Upgrade
23 California, because no one wants to invest in their home.
24 I think there's an analogous situation in the commercial
25 market when TIs occur, when owners want to improve their

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 existing space to try and lure a customer in. It's not
2 as straightforward as the residential case, and I will
3 admit, I don't know much about that market. So if you're
4 going after data collection or whatnot like that, I would
5 urge you to look at those markets and means to capitalize
6 on that because it's the only basis of low cost
7 financing, and people are going to do things when those
8 opportunities exist.

9 MR. PENNINGTON: Okay, thanks, Mike. So I want
10 to turn to people on the phone. I'll take a couple of
11 commenters. Again, what decision support tools do you
12 think we need to reduce barriers to energy efficiency,
13 demand, financing, and implementation?

14 MR. STRAIT: Bruce, if you'd like to speak,
15 please go ahead.

16 MR. RAY: This is Bruce Ray. Can you hear me?

17 MR. STRAIT: We can hear you.

18 MR. RAY: The question I had was maybe a
19 practical one. We heard an earlier presenter say that
20 the overall goal here is to achieve a 40 percent
21 reduction in energy use, or maybe it was just residential
22 energy use. We also heard, I think, one of the first
23 presenters note that a very substantial percentage of the
24 reduction in overall statewide greenhouse gas emissions
25 that are necessary to achieve the 2020 goals that AB 32

1 are going to come from energy efficiency and from
2 retrofits, and I guess the practical question I had,
3 then, was how many residential retrofits does the state
4 need to accomplish by 2020 to meet those energy reduction
5 goals and the AB 32 emission reduction goals? Is it one
6 million, is it five million, is it eight million?
7 Because I think you're looking at some very big numbers
8 and, unless you've got boots in the attic times
9 thousands, starting tomorrow at 8:00, I don't see how
10 you're going to do it.

11 MR. PENNINGTON: Okay, thank you. I don't know,
12 Cathy, do you want to respond to that at all?

13 MS. FOGEL: Yeah, I can try. I think, you know,
14 clearly the 40 percent energy reduction goal for existing
15 residential buildings is extremely ambitious. In the
16 Strategic Plan, it's broken down, I think, 25 percent of
17 homes would achieve 75 percent savings, and the other 75
18 would achieve a 25 percent savings, which makes it seem
19 potentially more reachable, but I think, you know, this
20 is one of those aspirational targets that was spoken of
21 earlier, perhaps even more so than the Zero Net Energy
22 Home goal, and, yeah, it's a valid question. There's
23 about 13 million residential dwellings in the State of
24 California, and I think, as we go forward, this effort
25 needs to be a little bit more realistic about how scaling

1 up might occur.

2 MR. PENNINGTON: Okay, thank you. We only had
3 one person on the phone that wanted to respond to that
4 question, so we'll move on to more questions. First to
5 the panel, how should we segment the market to best
6 design energy efficiency programs for existing buildings?
7 By type of decision maker? By buildings with, maybe with
8 different levels of access to financing? Or by the
9 technical potential of the buildings? Or some other way
10 of segmenting?

11 MR. STONE: I'm not sure you're going to like my
12 answer, Bill. My answer is I think that's a critical
13 question that needs to be answered in the Needs
14 Assessment. I don't think we're armed to answer that
15 question at this point. I think we need to find out what
16 the barriers are, I think we need to find out who -- what
17 parties in the long list of interested parties - which
18 parties think which issue is the biggest? And I think it
19 also has to be informed by what we can do, you know,
20 what's practical. I mean, there are some things I've
21 heard that we can do to get better penetration of energy
22 efficiency, and I shake my head and go, "God, I wish I
23 was that naïve still." Because I got a lot done when I
24 was naïve, and so I believe in people that are naïve and
25 that don't understand what you can't do because those the

1 ones that get it done. But, I now know what you can't
2 do, and so that was the barrier for me. I think we need
3 to wait until we get the research done to be able to
4 answer that question.

5 MR. PENNINGTON: Cathy, do you have any response?

6 MS. FOGEL: Sure. I mean, I think this is a
7 great question and from what I've seen, and, Bill, you
8 may have seen this, and others as well, in terms of the
9 utility approach down south, they're basically overlaying
10 these three screens to identify areas with LA County, you
11 know, another ARRA program -- Administrators and the
12 Contractors -- where to focus their efforts solely in LA
13 County, they're overlaying all of these screens, type of
14 dwelling, estimated annual income, and whether these
15 buildings are high energy users, or not. So I think we
16 need to increase that kind of targeting by utilities now,
17 but Nehemiah is really right that that's just the first
18 step, that's almost what you might call the low hanging
19 fruit in the whole home retrofit market now, and the CPUC
20 is very committed to moving the ball forward to make sure
21 that these programs can reach the multi-family market, as
22 well as lower income households. And I think the Needs
23 Assessment will be hopefully move us in the direction of
24 accessing those markets, or creating the policy framework
25 that can help the offering of services effectively to

1 those markets.

2 MR. PENNINGTON: Thank you. Do you have a
3 response?

4 MR. CROWE: I'm going to avoid answering the
5 question in a third different way here. I kind of
6 picture this: there will be kind of an overlay of
7 matrices that will cover the kinds of issues you
8 mentioned, and I think that if we're really wanting to
9 dig in with some technical questions, then on the
10 commercial side, I think there's going to be a
11 segmentation by size, for instance, on the HVAC side,
12 you're going to get the smaller buildings, which maybe
13 all have similar types of HVAC rooftop units packaged,
14 and then the larger commercial with the central plant
15 will be another way to segment to dig into some technical
16 questions. And then, when we talk about financing
17 instruments and motivations, I think we may have a
18 different kind of split, and in that situation you may,
19 for instance, find that multi-family, you may have some
20 similar issues to multi-tenant commercial, that could
21 lead you to develop certain tools and share certain
22 knowledge across sectors in that way. So I don't think
23 there's going to be a single way that we can segment the
24 market that would be appropriate for all the questions we
25 want to get answered.

1 MR. PENNINGTON: Okay, thank you. Anyone in the
2 room want to respond? Mike.

3 MR. GABLE: Mike Gable. Real quick, my
4 experience with the City of Hayward, looking at the age
5 of homes as a first cut is also a pretty good indicator;
6 despite all these years since the Standards took effect,
7 you would think people would have upgrade their homes,
8 but older homes haven't been upgraded very well, so age
9 of buildings - not so for commercial, it's more lighting
10 and HVAC driven which are more recent upgrades, but for
11 residential I think age of homes would be a worthwhile
12 thing to look at, at least.

13 MR. PENNINGTON: So do you think that should be a
14 strong priority in how buildings get addressed?

15 MR. GABLE: I agree with the comment about
16 layering different sets of criteria, I think it's just
17 one layer of criteria that should at least be looked at
18 as a possible guidance, so....

19 MR. NESBITT: George Nesbitt. I'd say, you know,
20 we could go after the biggest users first, I mean, that's
21 where big users, affluent users, you know, there's a lot
22 to be had there. But kind of to get back to what I think
23 Mike Keesee said, quite frankly, every time a plumber
24 goes out to a house, a roofer, a painter, an HVAC
25 contractor, those are opportunities, those are

1 opportunities to not only do what they are asked to do
2 right, but to identify other things that may need to be
3 done. Every time someone remodels, it's an opportunity
4 to do it right. Every time someone does an addition,
5 every time a house is sold, so there is no one set of
6 opportunities for identifying. You can have an old house
7 that is totally upgraded beyond current Code, or you can
8 have a new house that's so under-performing because it
9 was done wrong. You know, and some of these transcend
10 economics or location, but there's a million
11 opportunities. I kind of have a saying that generalists
12 need to be specialists, and specialists need to be
13 generalists, so, as a General Contractor, I need to know
14 enough about all the trades to know what's right and to
15 be able to make sure subs and others are performing it
16 right, yet the subs, the specialists that so under-
17 perform, as we know, as in their specialty, they need to
18 understand where they fit in the whole building, so when
19 they pull out their drill, put in those recessed cam
20 lights, and all the wires, all the top plates, the bottom
21 plates, that they know that they've got to seal them, and
22 also identify other things that are beyond what their
23 specialty is. So, I would say there's lots of
24 opportunities. And actually, that 40 percent reduction
25 goal actually came from myself and someone else who was

1 not supposed to be on that conference call that day from
2 the Bali Accords, so it was kind of interesting to see
3 the CPUC pick that up sort of as a minor goal in the
4 plan. Yes, it's high, but it's achievable, even my own
5 house, 1923, inefficient, even though I operate it fairly
6 efficiently, I still have an opportunity to save 50
7 percent. It's not going to be inexpensive, but, you
8 know, the opportunities still exist. So I have a million
9 other things I can say, but I'll --

10 MR. PENNINGTON: Thanks, George.

11 MR. HAMILTON: Daniel Hamilton with SMUD. Just
12 based on our limited experience so far with some of the
13 programs we're running, specifically the Home Performance
14 Programs, a fairly large DOE Program, if you want to get
15 real capture, the savings, the building doesn't matter
16 nearly as much as the occupant who is going to make the
17 decisions regarding the building. So, if we start
18 talking about segmenting too much into building types,
19 with newer and older buildings, energy efficient vs.
20 inefficient, we're missing out on the fact that the
21 buildings don't make the decisions, the owners of the
22 buildings make the decisions. So, I think if you're
23 talking about segmenting, you need to start targeting the
24 people who, for whatever social, psychological, financial
25 reasons, have the means and desire to actually upgrade

1 their homes consistent with their own personal values,
2 with the incentives offered, with whatever reason is out
3 there, you know, community engagement, there is all kinds
4 of reasons that are out there. Utilities track a lot of
5 this data, cities and counties track a lot of this data,
6 the state tracks a lot of this data. I think if you're
7 going to start prioritizing, you should be focusing on
8 the people willing to make those decisions and
9 investments, rather than the buildings that need them
10 because, if we're talking about a scale of things that is
11 not going to be accomplished, I think without considering
12 that fact as a major source, if not the primary source.

13 MR. PENNINGTON: Thank you. Pat.

14 MR. EILERT: SO I think more important than
15 segmentation is trying to identify how hard and how to
16 push alterations going forward. That's going to be
17 really the only way we can get to these goals is through
18 Codes and, then, underneath that, you know, there needs
19 to be some overlay of planning on top of the segmentation
20 and the more traditional programs.

21 MR. PENNINGTON: Okay, thank you. Anyone on the
22 phone?

23 MR. STRAIT: I'm not seeing anyone with their
24 hand raised.

25 MR. PENNINGTON: Okay.

1 MS. BEAUDETTE: My name is Barbie Beaudette, I'm
2 just a student in green building background construction.
3 I noticed earlier when we were talking about the lack of
4 marketing, the small budget being set aside for marketing
5 these kinds of projects for the folks that could use them
6 and benefit from incentive and things like that, and I've
7 been to meetings and have been involved in discussions
8 like this for awhile, and one of the things -- having a
9 background in real estate and real estate finance, as
10 well, I notice that real estate folks are usually one of
11 the opponents of doing ratings at the sale because they
12 feel as though, especially in these economic times,
13 that's going to be an issue. But there's another side to
14 it. If you have a rating and you have folks in this
15 mentality where they want to do fixer uppers, for
16 instance, if you have a rating that says, "Hey, here's
17 where you could upgrade this and make this home this much
18 better on a measurable scale," you actually have a
19 marketing tool and that can actually have -- I mean, if
20 real estate folks get behind this on a level where
21 they've got a way of marketing it as a good home because
22 of its rating, or as a home that's got lots of potential
23 to be upgraded, you've got an avenue for referrals for
24 doing work for what kinds of work that could be done,
25 you've got an opportunity as that home is open to be

1 evaluated where someone could go in and do that and
2 generate a lot of these kinds of efficiency upgrade
3 opportunities. Also, as far as barriers, something that
4 I've noticed, I'm a student in the Green Workforce
5 Training, and I'm a Certified Building Analyst through
6 that, but I've also found that because of the way that
7 the HERS training and the certifications go, there are
8 barriers to a lot of folks that are trained in the
9 building sciences to actually getting jobs because of the
10 certification right now, especially since it's just in
11 CalCERT's hands, there's a barrier for a lot of folks to
12 actually get into the field that's being held at a level
13 that, you know, a lot of those are publicly funded
14 things, they've put money into training these people, and
15 now they can't get jobs and use that training and apply
16 it, and be feet on the ground and do the work. So there
17 are some opportunities if those barriers are removed or
18 worked on somehow from that perspective, to get folks on
19 the ground to do the work, too.

20 MR. PENNINGTON: So I appreciate that comment.
21 The Energy Commission is working with the Building
22 Performance Institute right now and with CalCERT's to try
23 to do a better alignment with the HERS 2 training and the
24 BPI certification training needed to be certified, and
25 looking for ways to allow sort of pathways in for people

1 that have some of the capabilities that are needed, but
2 not all, and to create a process for doing challenges.
3 So there's very serious discussion underway right now for
4 how to do that, and hopefully that will improve the
5 situation that you found when you were trying to go
6 through it.

7 Another question that relates a little bit to
8 David's comments about where an occupant of a building,
9 or the building decision maker as being the critical
10 lynchpin in getting things done and, you know, if you
11 can't be effective in communicating with the building
12 owner, then maybe this other segmentation is secondary.
13 So one of the things that we're charged to do in AB 758
14 is to focus on public awareness and focus on outreach and
15 education and that sort of thing. So the question would
16 be, how should we be telling the world, or telling
17 California consumers, about efficiency and its benefits,
18 and what should we be doing differently to do that than
19 what we're doing now? So, Eliot, do you want to start
20 with that?

21 MR. CROWE: Yeah, I'll speak to the
22 nonresidential side that Nehemiah covered the
23 residential. You know, I've found in my direct
24 experience, which has been mostly with larger commercial
25 properties, that peer group pressure and peer group

1 awareness is very powerful, so case studies, you know,
2 wanting to be seen to be the best and share your success
3 stories has been proven to be very successful. I think
4 that, again, in my experience, finding examples of people
5 who have taken very aggressive approaches, whole building
6 focused, deep retrofits, really going after the deeper
7 savings, we've been working on some guides for the
8 Department of Energy recently, and outside of large
9 commercial office, there are very few good examples of
10 people taking deep approaches and very holistic
11 approaches. I'll correct myself -- there are some on big
12 box retail, but there are many sectors where there are
13 really no clearly identified leaders who are sharing
14 their stories, or maybe that means there are no stories
15 to tell, or that they are too worried about
16 confidentiality, or perhaps they just don't have a good
17 means to get their stories out, but I think that is going
18 to be a big plus if those kind of success stories can
19 support AB 758 and get out into the public domain.

20 MR. PENNINGTON: Okay, thank you.

21 MR. STONE: What I'm going to say partly relates
22 to the same thing that Eliot was just saying, but I want
23 to go back just a little bit to what I had said about
24 what Jill Marver told me about training, that it's the
25 right answer if lack of knowledge is the problem. It's

1 the same sort of thing here. In those cases where
2 energizing the homeowner or, from multi-family to
3 building owner, is the issue, then, yeah, we need to talk
4 about how do we do outreach to them that is effective.
5 But until we've done the Needs Assessment, it's really
6 hard to say which of the problems for which sectors of
7 the market, and at which point, and can you solve one of
8 those problems and you take care of it, or do you need to
9 solve five or six for this particular sector, and seven
10 or eight for that sector? So, you know, I think it's
11 important to look at how do we do better outreach, but I
12 think it's important also to remember that that's not
13 going to solve the problem in a lot of cases. So,
14 getting back to Eliot's point, in the residential sector,
15 I mean, I absolutely agree that when you give people
16 comparison to what their peers are doing, positive or
17 negative, that can be a most powerful driver.

18 Robert Cialdini with the University of Arizona
19 has presented on this at an ACEEE workshop on hot water a
20 couple years ago here in Sacramento, and in the
21 experiments that they did, when they said, "Hey, you
22 know, if you're at a hotel and your towel is still clean,
23 just hang it back up and then we won't wash it and you'll
24 help us save all this water." About one percent of the
25 people actually did something. When they changed the

1 message to say, "People like you that stay here, most of
2 them hang the towel back up when it's still clean so it
3 doesn't get washed," they got like 60 percent response.
4 So, nobody wants to admit that peer pressure is the main
5 driver for each of us, but it is true, it is the main
6 thing. So there's been a few experiments with telling
7 people what other homeowners on their block, or what
8 other tenants in their apartment building use in energy,
9 in the aggregate, or on average, or whatever, and if
10 those are designed right so that you're not discouraging
11 the people that are most efficient from doing anything
12 and encouraging them to start leaving the lights on
13 because, hey, we're the best in the neighborhood, as long
14 as it's designed right, that can be a real powerful
15 motivator. And if it comes with the message, you know,
16 "When you get your bill, if it says right on your bill,
17 not just, oh, \$78.00 this month, but it says, 'By the
18 way, five out of six of your neighbors only owed
19 \$60.00.'" "And here's a program you can get into that
20 will help you get better than your neighbors," I think
21 that sort of outreach will carry a lot of power.

22 MR. PENNINGTON: Cathy, do you want to respond?
23 Are you still there, Cathy?

24 MS. FOGEL: Yes, sorry, I had you on mute. I
25 agree with what's just been said and, to not repeat it,

1 I'll just add that, in the course of developing an
2 engaged 360, the Energy Division and the utilities did,
3 as I mentioned very briefly, commission some pretty
4 detailed ethnographic research that was both quantitative
5 and included qualitative interviews of a number of
6 California residents and came up with sort of five
7 personality profiles that are generalized, but you know,
8 reflect the sort of different types of folks out in the
9 California population with different values, education
10 levels, income levels, what they've already done in
11 energy efficiency, what they might be likely to do, so we
12 should take advantage of past research as we go forward
13 and shape anything new as one basic point, and I'll add
14 to that that there was also a fairly extensive utility
15 market research done before the launch of Energy Upgrade
16 California Incentive Program that's also quite
17 informative and showed, in addition to what's just been
18 said, that trigger points in sort of the course of
19 people's life, between having a baby, buying a home,
20 refinancing, you know, really important points to reach
21 people at with the message at those points, and also with
22 what's been said, the importance of financing, to people
23 actually being able to act. You know, I was sort of
24 wondering how much -- what's going to be the budget for
25 all this, and we need to take advantage not only of the

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 peer pressure Nehemiah mentioned, but some other behavior
2 change, social marketing techniques can really focus on
3 neighborhoods and community outreach, and generating
4 earned media, which I think will be essential going
5 forward.

6 MR. PENNINGTON: Thank you. Pat.

7 MR. EILERT: So, Nehemiah, I care about energy
8 efficiency, but I don't care what my neighbor uses, so
9 let's go ahead with the Needs Assessment, I think this
10 focus on peer pressure is a little bit too much today, so
11 far.

12 MR. STONE: But do you care what I think about
13 your energy use?

14 MR. EILERT: Yes, I do care.

15 MR. STONE: Okay, there we go. Write down "peer
16 pressure."

17 MR. NESBITT: George Nesbitt. I think it's going
18 to take a lot of consistent and reinforced marketing.
19 It's got to be down at the Building Department, it's got
20 to be at the Material Suppliers, the design houses, in
21 the architect's offices, and the contractor's, it needs
22 to be on the radio, on the TV, on the Web, wherever,
23 whether it's social media, you know, all forms, it just
24 needs to be a message that is constantly out there and
25 not something that comes and goes, which has often been a

1 problem. Back in the old days, I was in the RCP Program
2 when it died and there was marketing on the radio that
3 told you that you needed to call the Smarter Energy line
4 and then they'd get the referral to the contractors and
5 all that, and so programs come and go, marketing
6 campaigns come and go, and the problem is we keep
7 starting, stopping, starting and stopping. So we need to
8 maintain some consistency and it needs to be reinforced
9 on all sorts of levels.

10 And I want to bring back up an issue that Pat
11 brought up, was existing plus additions and alterations.
12 At Friday's Energy Code workshop, I suggested and I've
13 been bringing it up pretty much at every workshop, well,
14 how is this going to apply to existing buildings, so we
15 need to have a workshop on the 2013 Code updates
16 specifically for how we are going to apply it to existing
17 buildings because, you know, that's another way we're
18 going to reinforce this is by pushing it through Code.
19 Actually, speaking of Codes, RECO is one of those things
20 that's out there, and the City of Berkeley has, well,
21 I've been hearing for at least half a decade that we were
22 going to go to a performance-based RECO and now I guess
23 they're delaying it because they're, I guess, under the
24 delusion that Energy Pro will be fixed any time soon,
25 which is an issue, it's a tool that works, you can read

1 my 14 pages of comments, it's in the HERS 2, if you want
2 to know more about energy modeling than you care to know.
3 There are definitely issues with Energy Pro, how it's
4 implementing HERS 2. They're not totally insurmountable.
5 I have a long list that keeps growing. I actually have
6 not noticed the inconsistency that Mike mentioned in the
7 current version since it was given a heart transplant to
8 a more modern version of Cal Res, but I had noticed that
9 in the past where you look at it and, once you pass and
10 once you don't. It seems to have been greatly improved,
11 yet there's a lot of things, especially when we get to
12 existing additions and alterations, you literally -- you
13 cannot -- there's a lot of things you cannot alter,
14 certainly not as one file within Energy Pro, you pretty
15 much have to go to a two-file approach, but that's minor
16 in comparison. Many people think that HERS 2 is totally
17 broken, I'm not one of them. While it may need some
18 tweaks here and there, I think it's fundamentally sound
19 and, well, yeah, especially in regards to building
20 performance contractors and quality of work,
21 unfortunately, well, Energy Upgrade California being
22 consistent with HERS, I find that a little odd because,
23 in HERS, a HERS Rater can do a rating and so can a
24 building performance contractor, yet, in the real world,
25 a Building Performance Contractor does not exist because

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 there is no perfect HERS provider for one yet, yet in
2 Energy Upgrade California, only the home performance
3 contractor who is not certified or trained can do the -
4 not technically a rating, but the energy modeling, yet we
5 HERS raters can't, plus I have not seen any quality
6 standards for the contractors articulated, and I have all
7 my old manuals from the RCP program 10 years ago. We had
8 combustion safety. PG&E's lawyers did not have a problem
9 with combustion safety and, apparently, they've decided
10 to come out with a 62-point checklist for combustion
11 safety, which is a joke, it doesn't take 62 points. So,
12 and there's also a lot of gripes just from contractors
13 about the complexity and the constantly changing
14 requirements, and I certainly --

15 MR. PENNINGTON: So I'm going to move on to the
16 callers. Thank you.

17 MR. STRAIT: Yes, there's a Jim Jungwirth that
18 would like to make a comment.

19 MR. PENNINGTON: Okay, great.

20 MR. STRAIT: Jim, you are live.

21 MR. JUNGWIRTH: Okay, thank you. There were a
22 number of comments earlier talking about the commercial
23 building energy efficiency retrofits. It occurs to me
24 that it is most likely when the building owner or the
25 building occupant are the same. In Northern California,

1 the largest building owner occupant is the State, itself.
2 So my question is, are there things in those programs
3 that were described earlier in the day that specifically
4 will facilitate the Needs Assessment and the
5 identification of funding mechanisms for the energy
6 upgrades of State Buildings? And I think that, really,
7 if you really want to promote that, the best way to do it
8 is by example.

9 MR. PENNINGTON: Okay, thank you. Anyone else?

10 MR. STRAIT: I believe that is the only person
11 that had their hand raised to comment on this issue.

12 MR. PENNINGTON: Did you have a comment, sir?

13 MR. FRANCISCO: I'm Jim Francisco with Sierra
14 Consulting, but I want to talk to you as a consumer
15 instead of a businessperson here. Our utility in our
16 area sent out some pressure -- peer pressure mailings on,
17 "Jeez, your energy use is just so much greater than your
18 neighbors'." And I, for instance, my wife and I, jeez,
19 our house was built in '79, we said it probably needs to
20 be upgraded, so we put \$6,000 worth of windows in the
21 house. Got some more little things that says, "Jeez,
22 your energy usage is greater than your neighbors'." So
23 we put in \$13,000 worth of air-conditioning. Then my
24 neighbor comes over and says, "I don't know what's going
25 on with this utility, I keep getting these usage things,"

1 and he says, "I put in new windows and I'm still getting
2 them." So we got the neighborhood together and it seems
3 that this is a program that SMUD engages in, and I will
4 name them, and instead of getting us now to upgrade, if
5 we see a SMUD agent in the neighborhood, he's in danger.
6 So you've got to be very careful about what you're
7 putting out there and you better know it improves because
8 a lot of it does not improve what you're trying to do.
9 And that's my comment.

10 MR. PENNINGTON: Thank you. So we're reaching
11 the witching hour on this panel, so one more commenter.

12 MS. GAVRIC: Funny you should mention witch. My
13 name is Jelisaveta Gavric, and I'm with the California
14 Association of Realtors. And it may be a little bit
15 confusing to some of you if you've heard a different name
16 from me before, this is my ethnic name, you may know me
17 as Elizabeth Gavric. I just came here today to not
18 necessarily comment on any of the questions, but I did
19 want to give a little bit of a historic perspective to
20 the other people in the room here who have not been
21 involved with the Legislative portion of the fight to get
22 or to pass AB 758 Skinner. The bill actually started off
23 in a previous legislative session, it was AB 2678 Nuñez,
24 and that bill the realtors were vehemently opposed to
25 because a friend in the audience just said realtors tend

1 to be opposed to time of sale mandates, and we were. And
2 AB 2678 had a specific mandate for audits and
3 specifically retrofits at time of sale. The Legislature
4 did consider that bill and they decided that they would
5 not advance or pass that bill, that was something the
6 Legislature decided that they didn't feel was good
7 policy, and that was to advance a piece of legislation
8 which demanded retrofits at time of sale.

9 There was also similarly a bill recently passed
10 in the last session that was Senate Bill 407. That bill
11 initially started off by Senator Padilla as being a
12 mandatory time of sale water fixture retrofit bill, and
13 through a tremendous amount of debate and discussion,
14 again, within the California State Legislature, it was
15 determined that a time of sale program was not a good
16 approach to achieving efficiencies in California's
17 housing stock. And so that bill was eventually amended
18 to do just a date certain that all homes have to be
19 compliant with these fixtures, by several different
20 dates, 2014 for retrofits, 2017 for single-family
21 housing, and 2019 for commercial properties and multi-
22 family housing.

23 So going back to AB 2678, which is where the
24 genesis of AB 758, Assembly Member Skinner had the
25 wherewithal to understand all of the arguments,

1 complaints, and considerations that were given for AB
2 2678, and so when she reintroduced the concept, she
3 actually took out the point of sale mandate that was in
4 2678. She specifically stated in her bill that the
5 program, AB 758, would include a broad range of
6 implementation approaches, and she also specified in her
7 bill that assessments, ratings, or improvements will not
8 unreasonably or unnecessarily affect the home purchasing
9 process. And so I'm just here today to echo the actual
10 language that statutorily is in place that we are using
11 as the basis for the promulgation of these regulations.
12 I want to remind folks that, as we go forward in this
13 process, that the realtors are very supportive of
14 increasing home energy efficiency, and for Nehemiah and
15 Eliot, I hope that we are one of your 11 to 14
16 stakeholder interviews that you get, or at least -- no,
17 not getting that? Okay, well, then, I won't give you my
18 card then. But we do strongly believe that it will take
19 a lot of innovation to get that deep market penetration
20 that we need because you cannot take a market where it is
21 right now with less than two percent of houses turning
22 over, and half of those are banked owned. You cannot get
23 those homes energy efficient and achieve that 40 percent
24 goal that you would like to see by 2020, it simply cannot
25 happen. So we're here to help, we're here to advise and

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 see what we can do to at least provide insight into the
2 real estate transaction, we know that real estate will be
3 one star in the constellation that will make up this
4 program, we know it's not going to be the sun, it won't
5 be the center of the universe for us, it can't be, it's
6 just not functional, it's not the way this program is
7 going to be successful. And that's all I'm here to say.
8 Thank you.

9 MR. PENNINGTON: Thank you much. So I'm going to
10 call a close with that, thank you very much, everyone,
11 for your comments. Thank you very much for the panelists
12 to be here and make their presentations, so I appreciate
13 it. Thank you, Cathy. We're going to take a short
14 break. Is that right?

15 MR. STRAIGHT: Yes, we're going to have a five-
16 minute break. During this time, there's a small bit of
17 technical assistance I need to provide one of our call-in
18 users.

19 (Recess at 2:46 p.m.)

20 (Reconvene at 2:55 p.m.)

21 MR. LEAON: Okay, folks. If we could all find
22 our seats, let's go ahead and get started with our next
23 panel discussion. For the record, my name is Michael
24 Leaon, I'm the Manager of the Appliances and Process
25 Energy Office. And this afternoon we'll have a panel on

1 reducing plug loads in buildings, so we're switching
2 gears a little bit, but talking about a very important
3 component of meeting building energy efficiency goals. I
4 think we have another excellent panel for you this
5 afternoon. Our panelists will include a talk from Dr.
6 G.P. Li with UC Irvine, also Randall Higa with Southern
7 California Edison, he'll be telling you about standards.
8 We'll also -- a little change on the panel make-up for
9 this session -- Michael Siminovitch will not be able to
10 make it and the co-director of the California Lighting
11 Technology Center, Kosta Papamichael, will be speaking
12 instead, and we also have a remote presentation from Dr.
13 Carrie Armel with Stanford, and also we'll hear from
14 Jonathan Williams with Intel Corporation, and they'll
15 both be addressing the topic of alternatives to standards
16 for meeting building energy efficiency goals. So with
17 that, I'd like to go ahead and kick off our panel
18 presentations with Dr. Li, and Dr. Li, if you'd like to
19 come up to the podium?

20 DR. LI: Thank you, Mike.

21 MR. STRAIT: Uh, one moment, we have to locate
22 the presentation, just one second. Okay, we're going to
23 do a little change in the order of the presentation.
24 Randall, if you don't mind starting off, if that's okay,
25 we're having difficulty locating Dr. Li's presentation

1 and I'm going to go locate that and bring that back. And
2 in the interim, we'll hear from Randall.

3 MR. HIGA: Thanks, Mike. And welcome, everybody,
4 to the final panel presentation today. I'm going to be
5 talking about the Utilities Codes and Standards work
6 specific to plug loads and appliances, and in our world
7 sort of the plug loads and appliances are mostly
8 synonymous, but you know, the appliance standards also
9 relate to things like water heaters and small air-
10 conditioners, so it's a little bit expanded from just the
11 traditional plug loads. So I'm going to try to sort of
12 take off from where Cathy Chappell [phon.] left off this
13 morning, she was talking more about the Building
14 Standards related specifically to the buildings,
15 themselves; I'm going to be talking a little bit about
16 Building Standards, but mostly in the context of plug
17 loads, as well as, of course, appliance regulations also.

18 First, I wanted to give an overview of what the
19 utility programs involve and consist of, so the Codes and
20 Standards Program is a statewide program, meaning that
21 Southern California Edison, PG&E, SoCal Gas, and San
22 Diego Gas & Electric work together on the same program to
23 work with and support the California Energy Commission in
24 developing -- and I'll just say "more stringent" --
25 energy standards, both buildings and appliances. We do

1 deal with the Federal Regulations, and I'll talk about
2 that in a minute also.

3 So the four programs for the Codes and Standards
4 Program is we do the Building Code Advocacy, most of that
5 is Title 24, Part 6, we do get involved with Title 24,
6 Part 11, which is CalGreen, and we also coordinate with
7 the other model energy codes such as ASHRAE 90.1, IECC,
8 and some of the Green Building Codes as IGCC and the
9 IECC. Sorry for the alphabet soup there. The second set
10 of programs is pretty much the same thing, except we're
11 focused on appliance regulations, in this case, Title 20,
12 and also the Federal standards. We also have two other
13 sub-programs new for this Code cycle, and that is a
14 compliance enhancement, we call it holistic, meaning that
15 we're trying to increase the compliance rates across the
16 board, rather than any sort of focused activities. We do
17 some focused compliance enhancement activities under the
18 first two sub-programs, which we call extension of
19 advocacy, where we're trying to make sure that the
20 verified energy savings of new Codes that we are involved
21 with have the highest level of compliance. And then the
22 Best Practices pilot is a program that we're working
23 with, where we're working with roughly we're targeting
24 about 12 local governments statewide to sort of take a
25 deed dive into the processes for plan checking,

1 inspection, etc., and we're trying to come up with better
2 ways to get through that process of plan check and
3 inspection, and we're going to put together a report of
4 all the best practices and try to communicate that out to
5 the other cities in the state.

6 And the last thing is REACH Codes, and this is
7 where we work with local governments who are interested
8 in adopting ordinances that go beyond the base Title 24
9 Code, so because it is a highly political process, we
10 don't try to get involved with their politics and it's
11 more of a reactionary role in the sense that, if they are
12 interested in doing a REACH Code, we'll support them with
13 a cost-effectiveness analyses, ordinance writing, etc.
14 etc. Most of them, these days, are tied together with
15 Green Building Codes, so it's just an element of it,
16 including CalGreen which have Tier 1 and Tier 2 levels of
17 compliance, that is Tier 1 being 15 percent beyond Code,
18 which is where most of the REACH Codes are at these days,
19 and then Tier 2 at 30 percent beyond Code.

20 So, getting back to plug loads. These are some
21 of the three main areas in which we deal with plug loads.
22 So, as I mentioned before, as far as the first sub-
23 program, we're dealing with building standards and
24 building regulations. And we focus our attention on
25 Title 24, Part 6, but as I said, also Part 11, which is

1 CalGreen, as well as the model Energy Codes. And where
2 the -- one distinction maybe is how, one way to look at
3 it, is that we're not regulating the efficiency of plug
4 loads, but we're trying to set standards of regulations
5 for how the plug loads are used, and let me give you an
6 example. We're looking at requirements for office
7 buildings where task lighting would be on separate
8 receptacles that can be put onto time clocks, or
9 connected to the building energy management systems, so
10 they can be swept off at night, so we're not trying to
11 change the efficiency of those task lights, or they could
12 be printers, or monitors, or whatever, but we're putting
13 into the Building Code the ability, not necessarily
14 forcing people to do it because you can't tell people how
15 to control the buildings, but at least giving them the
16 capabilities to turn off those plug loads. We're doing
17 something similar for residential, and those are just a
18 couple of examples of how the plug loads actually could
19 be a part of the Building Code.

20 Of course, a key thing on plug loads is the Title
21 20 Regulations. Again, it's something what the utilities
22 do is develop in the same way as the Building Energy
23 Standards is, develop code change proposals to support
24 the CEC in developing new versions of other regulations
25 and Building Standards. So, thus far, the IOUs have been

1 -- the utilities have been involved in a number of
2 measures, those are just a couple of examples of them.
3 The most recent one completed, I guess, would be
4 televisions. I looked at sort of from our latest impact
5 evaluation studies, some of the highest energy savings
6 measures and those, I think, are the top four, so Pulse
7 Start, HID Lights, walk-in freezers and coolers, and pool
8 pumps. And currently we're working with the CEC on the
9 battery charger rulemaking, which we hope is going to get
10 wrapped up soon, and then we also have some future
11 proposals that we're thinking about and I'll get into
12 those in the next slide, what we're calling Phase 3 and
13 Phase 4. And lastly, we have been working with the
14 Federal Department of Energy in their appliance
15 regulation rulemakings, all of which are included as part
16 of Title 20, and of course the key issue with the Federal
17 Standards is, well, it's good in that you have a
18 nationwide standard for efficiency for appliances and
19 plug loads, it preempts the state from adopting more
20 stringent Codes, more stringent efficiency levels, for
21 those appliances. And these days, although California
22 may have started the regulation of appliances back in the
23 '70s, now the Federal Government has taken over the
24 regulation of a large number of those efficiency
25 regulations. Their process is a lot slower and, so, the

1 pace at which the regulations at the Federal level can
2 proceed is not generally as quick as what we could do
3 here in California.

4 The bottom line is, as you've heard in the
5 previous presentations, plug loads are significant energy
6 use in buildings, both residential and non-residential,
7 and to the extent that we cannot surpass efficiency
8 levels of those Federal requirements, it does pose a
9 significant barrier to reaching the Zero Net Energy
10 goals, so it's something that we're trying to work
11 around, work with, and work with the DOE to get the
12 highest efficiency levels that we can.

13 Getting back to the upcoming Title 20 topics,
14 this is just an example of the items that we're
15 considering proposing, and I won't read through all of
16 this list, you could take a look at these. We see the
17 Phase 3 starting, having the scoping workshop later this
18 year, and then Phase 4 following that at some time. This
19 is just a little chart to give you some idea of what kind
20 of energy savings, the orders of magnitude of energy
21 savings, the battery chargers, ones that we're involved
22 with now. As you can see, it's roughly 2000 gigawatt
23 hours per year. Again, that's after turnover which we've
24 got defined at the bottom there, first year savings times
25 estimated useful life.

1 So we're talking about pretty big energy savings.
2 Again, I think you saw from the previous presentations,
3 you know, how big these markets are and how much we're
4 impacting the marketplace with these appliance
5 regulations. Again, it affects both new buildings,
6 existing buildings, everything, because everything that
7 is sold will have to meet these regulations.

8 So just in summary, this is what we see as
9 potential benefits of the future Title 20 topics, and
10 those of you who have been in the workshops before will
11 recognize these, they are the same slides, but I just
12 wanted to sort of reiterate that this is a big deal,
13 there's a lot of energy savings here, there's a lot of
14 potential, but this doesn't necessarily get us through
15 this barrier of preemption, and it doesn't by itself get
16 us to ZNE, so, you know, more work is still required, but
17 at least I think we're off to a good start. So, thank
18 you.

19 MR. LEAON: Thank you, Randall. Okay, so we're
20 going to proceed with Dr. Li's presentation. Peter, if
21 you could get that teed up and, Dr. Li, let me give you a
22 proper introduction here. Dr. Li is a Professor at the
23 University of California Irvine with appointments in
24 three departments, Electrical Engineering, Computer
25 Science, and Chemical Engineering and Materials Science,

1 and Biomedical Engineering. At UCI, he also serves as
2 Division Director of the California Institute for
3 Telecommunications and Information Technology, and
4 Director of the Integrated Nano Systems Research facility
5 in the Henry Sumueli School of Engineering. He receives
6 his Bachelor's Degree in Electrical Engineering from
7 National Cheng Kung University in Taiwan, and his
8 Master's and Doctorate Degrees also in Electrical
9 Engineering from UCLA. Dr. Li.

10 DR. LI: Thank you so much, Mike. Before I
11 start, I would like to take this opportunity to thank the
12 Organization Committee for inviting me to come to this
13 meeting and I would also like to thank you, the audience,
14 to allow me to share a research idea with you. And
15 lastly, I would like to take this opportunity to thank
16 CEC PIER Program for their support to our Centers.

17 So, currently we are working on the California
18 Plug Load Research related topic and just started the
19 Center in UCI. So the topic I'm going to present to you
20 today is The Big Picture: Importance of Plug Loads in
21 Meeting Zero Net Energy -- Existing Energy Efficiency
22 Goals.

23 So I am showing here in the last four years, we
24 have witnessed the tremendous growth of plug load devices
25 at home. Starting in '70, it was about two devices; in

1 this generation, we are talking about more than 40
2 consumer electronics devices at home. And this
3 penetrating of the consumer electronic devices,
4 penetrating into the home, can be attributed to the
5 success of semiconductor, microelectronic technology
6 following the Moore's Law in that industry, we have
7 witnessed every two years they have doubled the density
8 of the memory, and doubled the processing power. As a
9 result of that success, we have seen the affordable
10 processing power, information processing, information
11 communication, and control, at the fingertip of the uses.
12 And this is really good for the economic growth, but it
13 also puts tremendous stress on the energy consumption in
14 our communities. So, more than that is, this kind of a
15 consumer electronic plug load is not typical Building
16 Standard problems. The reason for that is, these devices
17 have wide range of devices, as I illustrated earlier to
18 you, more than 40 to 100 devices. And what are the uses
19 of those devices? They are used ranging from two-years-
20 old all the way to 100-years-old, so you don't have a
21 target user group to come up with a standard, or come up
22 with an incentive for the use to adopt the most energy
23 efficient solutions.

24 Also, the retailers, they have a wide range to
25 sell the product to the consumers, and most importantly,

1 because this is following the semiconductor,
2 microelectronic industries, so it has a very fast
3 development cycle, so almost every two years you will see
4 a new generation of consumer electronic plug load
5 devices.

6 And the example of the iPhone and the iPad, we
7 have seen is almost every six months we have a new
8 generation coming up, so this is the reality we're
9 dealing with in the plug load environments. So, as a
10 result of that, depending on what report you are reading,
11 we see in today's, the consumer plug load devices
12 contributed to about 10-15 percent of over energy usage
13 at home and, in the near future, according to the
14 predictions, it will grow to 30 percent of over-energy
15 usage. So this becomes a major issue we have to deal
16 with.

17 To further validate these statements, here shows
18 a report, the forecast report from Department of Energy,
19 using the 2006 study reference point about the energy
20 usage growth in the residential area due to the plug
21 load. So what you can notice here is, in most of the
22 sector of the so-called ether-wire goods, or the
23 lightings, or the water heating, and so on, in the next
24 20 years we see sort of a steady growth, it's a relative
25 fact. On the other hand, when we look at the plug load

1 devices, continued growth. So, if we use the number of
2 the household growth rate in the United States in the
3 next 20 years, and look at it compared to the plug load
4 devices, it's substantially higher than that. And the
5 reason for that is the plug load devices is not used by
6 only one person, so now you can imagine, for one cell
7 phone, in the past, we think about one phone per
8 household, now we are talking about one or two phones per
9 person, and the number makes a difference. And think
10 about worldwide, when we have more than one billion cell
11 phones in use, and the number makes a difference even
12 though individual plug load devices use less energy, and
13 they are more energy efficient. So that is the issue at
14 hand we have to deal with.

15 So, similarly, from that same report, in the
16 commercial, the residential and non-residential area, we
17 also see the growth of the plug load energy usage as
18 compared to the growth of the floor space. Again, they
19 are attributed to the plug load related to the office
20 equipment, and also a variety of like the ATM, telecom
21 gadgets, and so on. So this is the growth area. So far,
22 we don't have a very good way to control the use of
23 energy due to this tremendous growth of the use of the
24 plug load devices in both residential and non-residential
25 areas. So, these plug load devices further complicate

1 the issue of over-energy consumption. The reason for
2 that is, so far, there are only a very limited number of
3 plug load devices that have been studied. For example,
4 external power supply, the battery chargers, and the TV
5 and so on, they are only a few that we have done
6 tremendous study, and more work is needed to be done.
7 But more than that is, so far, we have not done more job
8 about the interaction of many plug load devices; for
9 example, at the home, entertainment system, you can
10 imagine they are more than 10 devices that plug in, and
11 to give you one example, when I watch TV, sometimes I
12 need to turn on the VCR and either turn on the DVD, I
13 need to turn on the stereo, and so on, and by the time
14 I'm done with watching TV, sometimes I forget to turn off
15 other plug load devices, I just turn off the TV and walk
16 away. So, the interaction of other plug load devices
17 become an issue to us in terms of over-energy savings.
18 So, in order to come up with a solution, we have to think
19 about it's not only in the visual plug load device
20 efficiency, but also the interaction among them, we have
21 to come up with a solution like that.

22 So as a result of this progressive use of
23 microelectronic devices in the consumer electronics, we
24 also accelerate the use of the devices in different
25 sectors of business. And for example, now days, you can

1 easily see those plug load devices used in the buildings
2 as a way to do Demand, Response and Demand solutions, and
3 also using the vehicles and using the wire good area as
4 intelligent appliances, and so on.

5 But one unique feature about the plug load
6 devices is we are using the semiconductor microelectronic
7 technology, and they are all powered by the DC source,
8 and they need to have a timer embedded. So, by the time
9 you turn off your appliances, the timer needs to be on,
10 as a result you have continuous AC to DC converging to
11 power up your timers. As a result of that, you do see
12 additional so-called Vampire load which you don't see
13 that in the regular traditional appliances. When you
14 power up the appliances, actually, the device is still on
15 and, in the steep mode [phon.], in the Vampire load,
16 energy consumption ranging from .5 watt to 1 watts. But
17 think about it now a days, in U.S. we have more than four
18 billion plug load devices, so what is the energy
19 consumption? That's a four billion watt hours and 7/24,
20 and how do we deal with that? So the real issue is, a
21 simple sum, it's more than the past of the audio plug
22 load devices. And this issue is further complicated by
23 the emerging demand of plug load devices at home. As you
24 know, our nation is moving towards managed care in order
25 to provide higher quality of care, at the same time

1 reducing the cost, so that the ration in the managed care
2 is, for example, to have a medical home device, medical
3 home solution, as well as tele-medicine, so that the
4 doctor can get into the iPhone or Smart Phone and talk to
5 the patient at home, and the patient also can talk to
6 some of the technicians and to discuss the testing
7 results and so on. So all of the devices used here are
8 plug load devices. Even now, you will see more use of
9 the devices in this medical home industry, for example,
10 now there is for the diabetes patients, they deal with
11 the special insulin pump, it senses the glucose level and
12 injects insulin. And you will continue to consume the
13 energy, but in the future what we see is these medical
14 devices number will grow, as well. And this is very
15 similar to the automobile industry, and in that industry
16 we have seen more than about hundred sensors embedded
17 inside the car as a way to improve, enrich driver's
18 experience. And we see the same thing what happened here
19 as a result of using those sensors, that it will enrich
20 patients' or users' experience and actually manage their
21 wellness and care. And all the devices become sort of
22 plug load devices at home and it will consume the energy,
23 as well. So this is a really emerging demand of plug
24 load devices.

25 So far, in medical sectors, we have not done any

1 regulation of medical devices, they are regulated by FDA
2 to deal with safety of the devices, as well as efficacy
3 of the device. So we have not done any Standard Code for
4 the medical devices. And it consumes about four percent
5 of over-energy in our nation. So, there is a need to
6 look at those emerging markets and see how we come up
7 with solutions.

8 So, at this point, I would like to point out how
9 to take a holistic approach so that we can come up with a
10 solution to what is a Zero Net Energy Efficiency
11 Buildings. So one thing I like to bring to your
12 attention, most plug load devices are developed based on
13 the consumer - based on the semi-conductor
14 microelectronic devices. So they are powered up by the
15 DC source. So, in order to have the timer on, we always
16 need to have the device plugged in, to have the AC to DC
17 consumption. So the one question we could ask ourselves,
18 in the future, would a building battery save energy as
19 compared to the full-time AC-DC conversions? So far, do
20 we have that solution? That's one simple question. I
21 don't have the answer yet, and that is some issue we need
22 to look at. And the second thing is, when we talk about
23 on-site renewable energy generation such as the solar
24 panels, and the fuel cells, or the windmill, and so on,
25 they all generate DC power. But what we did is to

1 convert the DC to AC, it has 10 percent efficiencies. By
2 the time we use the electricity at home for the plug-load
3 devices, they are all powered up by DC, even the TV,
4 right? So we have to go through the process of
5 converting the AC to DC, again, that is 10 percent
6 efficiency. So overall, by going through the process, DC
7 to AC, AC to DC, we lost 20 percent of efficiency. And
8 have we done anything about that? And that is the
9 question we're posing here. So should we think about in
10 the future, should we have a DC distribution system in
11 the buildings? Right? So we can isolate the DC system
12 from the AC system, and because this is a generation of
13 distributed generation, so that is the question we are
14 posing here as a way for discussions.

15 Also, as I mentioned earlier about emerging
16 market demand, or plug load, in health care, in home
17 entertainment, social media, social network, and the
18 video conferences, they are all devices we see have a
19 tremendous use to help us manage our care, or manage our
20 wellness, or to have a way to reduce travel to visit
21 doctor's office, or to have sort of a telecommute instead
22 of coming to Sacramento for the conference, I can stay in
23 my office to have video conferencing with all of you, and
24 it will save energy in a different form. So we need to
25 think about the new Standards for the plug load

1 efficiency in terms of over-energy saving, not just
2 electricity efficiency itself, but overall energy saving
3 because you can reduce energy consumption in different
4 forms. So I think that is another topic that always
5 comes up in my mind, is how do we deal with that. So
6 far, we don't see a way to handle that.

7 And the other area is the Demand Response for the
8 plug load in buildings. As I mentioned to you earlier,
9 there are many opportunities here to introduce the Demand
10 Response solution to the buildings and to the plug load
11 devices as a way, say, for example, depending on the
12 occupancy inside a building, you can turn on and off air-
13 conditioners, you can turn on or off the lights, and so
14 on, as a way to further save energy. And that can be
15 sort of an incentive program to have a better rating for
16 the residential home, or non-residential buildings,
17 instead of having Standards. So those are the tradeoffs,
18 I really don't have the answer, and it is worthwhile
19 discussing. And also, when we look at all the sort of
20 very short development cycle for the consumer electronics
21 and we need to have production of ever improved energy
22 efficient solutions. We have to look at different
23 incentive approaches. Currently, when we think about the
24 incentive program for the consumer electronics, all we
25 think about is the consumers, but I know the CEC and also

1 two of the companies are looking at different incentive
2 programs to provide incentives to retailers. For
3 example, if you provide \$20.00 rebate for buying a high
4 energy efficient flat screen TV for a consumer, that is a
5 very small percentage, but if you provide \$20.00 to a
6 retailer, their profit margin is, I don't know, \$50.00,
7 they do have incentive to sell more energy efficient
8 products, so that is a different game change. And that's
9 worthwhile discussing here, as well. And lastly, one
10 thing we do know is consumer electronic cycle, much
11 faster than the center can do, so this is - a lot of
12 opportunity for us to think about, most of the consumer
13 electronic use is the younger generations, they are the
14 agents of change, they are sort of the early adopter of
15 any new gadgets, so if there is a way to use the Social
16 Network, use a different platform, media platform, to
17 reach out to their audience, maybe there is a way to do
18 game change instead of dealing with traditional Codes and
19 Standards approach. So I think that is the opportunity
20 area for us to reach our goal, as well.

21 So at the end, I pose a question. Dealing with
22 energy is at the start of forever, right, so we talk
23 about 2020 for the home and 2030 for the buildings, non-
24 residential buildings, we know to reach our goal is
25 challenging enough, but can this Zero Net Energy last as

1 the family grows and prospers? An example, we know back
2 to '60s, on the average in the United States, one car per
3 household; today it is 2.3 cars per household. That is
4 the nature of the growth, that is the economy we have
5 here, and we know that is going to continue growth as we
6 prosper. So how do we come out with zero net energy and
7 last forever? It's not just for one year, or 2020, or
8 2030. And how can we handle growth demand for plug load
9 in the emerging markets? And this is also, as I
10 mentioned earlier, because more and more devices will
11 come and I do believe every year we will see maybe 10
12 more new devices, every time when you visit consumer
13 electronic tradeshow in Las Vegas, you will see the
14 number of attendees, it is double every year, and we see
15 that as the market we're dealing with. And how do we
16 really join forces with them and encourage them to
17 provide more energy efficient solutions to our sectors of
18 business? It would be one of the things we need to work
19 on, so also in today's discussion, in the morning and in
20 the afternoon, first sections, always ask a question, is
21 zero net energy efficiency a requirement just for the
22 building or for all of us? I think that is a question we
23 need to answer. It's not just built and we are ready to
24 go, it's when we live in there, and how we use the plug
25 load inside the building that makes a tremendous

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 difference in the outcome of energy savings.

2 So, to deal with all the issues at UCI, we come
3 up with the so-called California Plug Load Research
4 Centers, and we are taking a holistic approach, including
5 energy research for coming up with the solutions. And
6 also, we are working with the professors in Social
7 Science, as well as in Economics, to come up with market
8 behavior research to understand the implications of the
9 plug load on the adoption of the solution for energy
10 efficiencies. And also, we will work closely with the
11 CEC, CPUC, and utility companies and manufacturers and
12 retailers and common organizations and so on to organize
13 and coordinate efforts. I think that this is the only
14 way we can come up with consensus and to come up with a
15 solution. And lastly, we have to bring the awareness to
16 the public. Education is so important. We happen to be
17 education sectors, and we are very creative to come up
18 with the different media channels to reach out to our
19 youngsters and see how we can include them in the process
20 in achieving our zero net energy goal. So if you are
21 interested, please join us in California, Plug Load
22 Research Center, an attachment at the end of the slides.
23 Thank you.

24 MR. LEAON: Thank you very much, Dr. Li. Next on
25 the panel discussion we'll have a talk from "Kosta"

1 Papamichael. Kosta is a Professor and Co-Director of the
2 California Lighting Technology Center at the University
3 of California Davis. Kosta holds an Architectural
4 Engineering Degree from Aristotelian University in
5 Thessaloniki, Greece, a Masters in Architecture from Iowa
6 State University, with a major emphasis in Building
7 Science, and a minor in Energy Systems Engineering, and a
8 PhD in Architecture from the University of California at
9 Berkeley, with a major emphasis in Design Theories and
10 Methods and minors in Building Science and Computer
11 Science.

12 During the last 30 years, Kosta has been working
13 on the development of energy efficiency strategies and
14 technologies for buildings, focusing on lighting,
15 daylighting, and the integration of electric lighting and
16 fenestration controls. He participates in a wide range
17 of academic and professional activities related to
18 daylighting, electric lighting, energy, and environmental
19 impact. He is author and co-author of over 80
20 publications and holds four patents on lighting controls.

21 Kosta is also a member of several committees
22 addressing lighting and daylighting issues, and currently
23 serves as the Chair of the Illuminating Energy Society
24 Daylighting Committee. His work in photo sensor-based
25 lighting controls for daylight harvesting was recognized

1 by the Illuminating Engineering Society as a unique and
2 significant advancement to the Art and Science of
3 Lighting. So, with that, Dr. Papamichael.

4 DR. PAPAMICHAEL: Thank you very much, Mike. And
5 good afternoon to everybody. Mike is sending greetings,
6 Michael Siminovitch, he is sorry that he couldn't be
7 here, he has jury duty, his experience, the privilege of
8 being an American citizen, I guess. So I am here in his
9 place to talk to you mainly about lighting plug loads.
10 This is a presentation that Michael put together, he
11 trained me yesterday, and here I am to give it now for
12 you.

13 There are three main plug loads that we have
14 identified in lighting, task lighting in office spaces,
15 that is the commercial part, portable lighting in
16 residential, and then some of the high bay lighting is
17 also a plug load, considered as appliances. So I am
18 going to talk today about these three areas where
19 lighting and plug loads intersect.

20 The key efficiency drivers that we see for plug-
21 based lighting, it comes in two forms, legislative and
22 technological. The technological growth that we have
23 been seeing in lighting over the last 10 years is really
24 amazing. We heard from the previous speaker, Dr. Li,
25 that the semiconductor industry, they have a pace of

1 their own, but the lighting industry was an extremely
2 slow moving industry. We increased the fluorescent
3 efficiency by one percent every year since the '60s and
4 '70s until today, we saw LEDs going from 20 lumens per
5 watt in 2004 to now more than 100 in the lab, 150. And
6 this technological growth is truly a major driver that
7 effects plug-based lighting.

8 On the Legislative front, we have the Huffman
9 Bill we talked about there, Title 24 and 20, and the
10 Strategic Plan, several speakers mentioned that, I will
11 not spend more time on that, here it is again. When it
12 comes to commercial Title 24 or the current drafted 1324,
13 there is a potential increase through that on lighting
14 plug loads. Actually, we had Karl earlier mentioned the
15 task ambient approach for office lighting. We would say,
16 we have found over the last decade to be a pretty good
17 and effective strategy that people like and embrace, and
18 the whole idea is you reduce the overhead lighting to
19 provide only ambient light, rather than providing task
20 lighting everywhere into the space. And then you give
21 people high quality task lights that they can place and
22 orient the way that they want to do their task job. And
23 here, the main issue is the basic principle of light, the
24 inverse square law, if I have a task light at this height
25 illuminating my desk, I can do that with 30 watts and to

1 bring the same light here from the ceiling, I need more
2 than 30. So the whole idea is bring the light source
3 closer to what we want to illuminate, and then use the
4 general lighting for ambient lighting. We have gotten
5 repeatedly 50 percent savings over Code that is .5 watts
6 per square foot in many different applications. And
7 people really like it. So we see encouragement of the
8 use of task lighting in the future, any office of the
9 future that will have a change, or will bring a change in
10 the commercial plug loads in office spaces.

11 Here is a diagram that shows the drops that we
12 have done, and this was back in 2007, considering
13 another, if you like, wattage 1.75 watts per square foot
14 being used in existing spaces. The current standards
15 were down at 1.1 or at 37 percent reduction. The best
16 practice that Karl, again, mentioned and it may be key to
17 achieving these goals in the right way and the right
18 time, I think, brings it down to 57. We think that with
19 task ambient lighting, we can go even further down to
20 .50. Here are the 60-80 percent that we want to get from
21 the California Strategic Lighting Plan. The task
22 ambient, as I explained, is something that many people
23 have truly embraced. It wasn't easy to do, the right
24 strategy for it is to spread it evenly. We did first
25 some mistakes to over beam the overhead light and give to

1 people too much of a task light. We've seen relative
2 terms, so if we take one light source in the space and we
3 make it too bright, everything else appears dim. And
4 inversely, if we dim some of the lights in the space,
5 whatever is left will appear too bright, so a good
6 balance is the key to produce the energy savings along
7 with the occupant acceptance.

8 We see two ways that this task ambient approach
9 can help, one is through Title 20, addressing efficacy in
10 lighting quality, I will talk more about this quality.
11 Traditionally, we have been addressing mostly efficacy,
12 and not as much as the quality, and through efficacy,
13 manufacturers gain all of the utility programs if you
14 like, but they lose the end users. Quality is really
15 what the end users are out getting in the market, and we
16 should try to focus more on that. And on the Title 24,
17 the Building Codes, we're going to see changes in power
18 density, and then we can also consider credits for task
19 ambient lighting approaches.

20 Here is a slide on the high bay lighting. I will
21 not see much more, we show the electronic ballasts and
22 the inherent controls that come with electronics
23 controls, that can be used for Demand Response, so this
24 is something that we should be paying attention. Also,
25 with occupancy controls, we can turn lights off or dim

1 them down when there is no one there, and this is again
2 another area where we believe plug loads will be
3 affected.

4 Then we come in to the residential part of the
5 lighting. We talk a lot about residential and, truly,
6 going into spaces like these, you're going to see all
7 kinds of forms and shapes, and interestingly enough, most
8 of them are being sold with a CFL that, when people go
9 home, they just get out and they throw it and they put
10 the light that they like. We did a study back when the
11 Huffman Bill came along to see, is it possible to truly
12 go and have these reductions, and here is from the 2007
13 that moves through 2018, and this is if we really do
14 nothing, and we just keep on increasing the residential
15 square footage, we would see this type of an increase, if
16 you like. But, if we change all of the light sources to
17 40 lumens per watt or more, we can see that, yes, it is
18 possible to clearly meet the Huffman Bill, so it was not
19 something that was impossible; if you use the right
20 sources, you can do it. Unfortunately, the way that we
21 see it, it is not going to happen with halogens and
22 incandescent, which is what we expect people to like,
23 being used to incandescent, it's going to have to be done
24 with CFLs and LEDs. And here is where we need to make
25 sure that we learn from the mistakes that we have done

1 with the CFL type of distribution. We think, with
2 Michael, we share this experience and the explanation, if
3 you like, that the CFL was a disaster mainly because we
4 focused so much on efficiency and cost, and we forgot
5 what it is that people pay when they go into a store to
6 buy something. So we propose, as you will see later, we
7 are really focused on addressing lighting quality.

8 In Title 20, Portable Lighting Wattage
9 Limitation, we have the 2000 1845 lumens per watt, and we
10 expect that this will leave mostly the CFLs and LEDs some
11 incandescent technology can reach that level with
12 halogen, and the IR Coatings to heat up the filament even
13 more. The key opportunities that we see is Title 20 to
14 regulate lamps, we see tremendous promise, if you like,
15 in LED lighting. You can do much much more than we ever
16 expected and there are some pretty interesting value
17 propositions that will make people pay for them, not to
18 save energy, but for the amenities that they can get
19 through it. We can also have voluntary standards and,
20 again, regulating the quality is really a key element and
21 quite a lot of those are going to go in portable
22 lighting, plug lighting. So we truly see residential
23 lighting as a target for efficiency programs and they're
24 subject to massive change.

25 The experience that we had from the past, again,

1 here is the distribution of CFLs vs. incandescent, and
2 you see that the new construction in California, that
3 Title 24 has been highly successful and we got, really in
4 the new construction, 58 percent. We don't really know
5 how many of those stay there. On the break, I heard
6 again another story of many such stories, that people
7 actually take the fluorescent lights out and they put in
8 incandescent, and again, this is a lesson for us to
9 provide better quality. If we see the whole California
10 housing stock, we see that still CFLs is about 20
11 percent, and we are the number one state, so apparently
12 we really need to do more and this is actually pretty
13 good seeing how much we can do with all of the
14 incandescent that we have. And we believe, I think I
15 have it on the next slide, that we can chop off easily
16 with plug loads on lighting about 20-25 percent of the
17 incandescent in existing houses. Yes, here is the chart
18 that shows -- actually, the biggest one here is the table
19 lamps, you can see over here, we have torcheres and floor
20 lamps over here, together they are about 20 to 25 percent
21 of lighting. In 2007, as I showed with CFL use, it was
22 at about 15 percent, and actually I didn't show that, I
23 show it now, it was about 15 percent, and after a lot of
24 effort and a lot of money, by 2010, we were up to 20
25 percent which is a very very slow increasing adoption

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 and, again, we believe that the main reason is the lack
2 of lighting quality mainly on color, temperature, color,
3 appearance, if you like, longevity, quite a lot of the
4 CFLs didn't live to their promise for a long life mainly
5 because they were putting in down lights where
6 incandescent had a great time, they're not scared of
7 heat, but in CFLs the electronics fried. I lost all of
8 the seven CFLs that I put in my kitchen, after I was able
9 to convince my wife and sell her on longevity and they
10 were all gone without six months, and in seven years we
11 hadn't changed a single incandescent, so right now she is
12 into incandescent and there is nothing that I can tell
13 her.

14 So the major barriers with CFLs, one of the first
15 ones was the color, appearance. People were expecting
16 the warm light of incandescent lighting and they really
17 didn't get that. The longevity, I just described my
18 experience, and I heard quite a lot of experiences like
19 that. In certain applications, they will last, but if
20 the luminaire is not designed for them, chances are that
21 they will overheat and die young. Dimming was another
22 interesting issue that came up with CFLs and it's still a
23 very big issue. We all should try to promote dimming and
24 we still believe in dimming, that it is a great strategy
25 to save energy. If I have a dimmer, there is always one

1 way that I can go -- down. And fortunately, most of the
2 CFLs, especially the low cost CFLs that we distributed
3 and we flooded the market, they couldn't do that
4 effectively.

5 Now, with LEDs, which truly have an amazing
6 promise and they are even more efficacious than CFLs,
7 with plenty of things to do, still we can see exactly the
8 same type of issues, the color, appearance, the
9 longevity, the dimming, the lighting quality color, etc.,
10 we really need to address quality issues and bring the
11 consumers into the equation, get the consumers to tell us
12 what it is that they like to do. We believe that with
13 LED lighting, we have already won the efficiency game, we
14 are up to 100 lumens per watt, even with 30 lumens per
15 watt, we can save 50 percent of the electric lighting
16 through lamp replacement. Being at those high levels of
17 100 lumens per watt, we think we can sacrifice 10 and 20
18 lumens, and 30 lumens, to bring the quality high so that
19 consumers go and buy them because they really like it,
20 and for the amenities it provides, rather than accepting
21 it to save the energy and not being happy with it.

22 And this is my last slide where, again, I'm going
23 to make the point pretty fast because many have made it
24 already, that it's the existing homes that really hold
25 the promise on meeting the aggressive goals of

1 California. This is pretty much a generic plot, if you
2 like, and you can see a two percent increase in the
3 growth, and if here we're at 2010, by 2018, we still have
4 more than 80 percent of the actual load being in existing
5 buildings. Thank you very much.

6 MR. LEAON: Thank you very much, Dr. Papamichael.
7 Next up, we're switching topics to Beyond Standards, and
8 we're going to be discussing Alternative Approaches to
9 Appliance Standards for Meeting Energy Efficiency Goals.
10 And Dr. Carrie Armel will be making a presentation
11 remotely. And while Peter is getting that organized, I
12 will go ahead and introduce Dr. Armel.

13 Dr. Carrie Armel is a Research Associate at
14 Stanford's Precourt Institute for Energy Efficiency,
15 where she investigates the diverse ways in which an
16 understanding of human behavior can lead to improvements
17 in energy efficiency. Dr. Armel co-chairs the Behavior,
18 Energy and Climate Change Conference, oversees Precourt
19 Institute's behavior and energy, bibliographic database
20 and website, and teaches courses on behavior and energy
21 at Stanford. In addition to these initiatives, Dr. Armel
22 developed specific energy efficiency interventions that
23 apply behavioral and design principles, and develops
24 measures to evaluate the efficacy of such interventions.
25 Her most recent project involves a collaboration between

1 academic and nonacademic organizations to design and
2 evaluate a technology that takes advantage of Smart
3 Meters to provide feedback to residents on home
4 electricity use. Dr. Armel completed a PHD in Cognitive
5 Neuroscience from the University of California at San
6 Diego, and Post-Doctoral Work in Neuroeconomics at
7 Stanford. In these programs, she employed behavioral,
8 psycho-physiological, and neuroscientific methods to
9 investigate how effect and motivation influence behavior.
10 She most recently completed post-doctorate work at
11 Stanford School of Medicine, translating intervention
12 techniques used in health promotion work into the domain
13 of energy efficiency. Dr. Armel.

14 DR. ARMEL: Hi. Good afternoon. Thank you so
15 much for having me, it's a real honor to be able to speak
16 today. I also appreciate the behavioral comments by the
17 previous two speakers, they're a good set-up and I'm glad
18 to see that people are identifying behavioral issues and
19 the importance of that.

20 So today I'm going to give an overview of our
21 ARPA-E Grant which focuses on residential buildings and
22 ties into behavior, energy use, and also sensor
23 technologies. We have some work on transportation and
24 also small and medium commercial, but the focus of our
25 initiative is on residential buildings. And I guess I'll

1 just say "next slide" for you to queue them forward?

2 MR. STRAIT: That will be fine.

3 DR. ARMEL: Okay. So go ahead to the next slide.

4 So before I tell you about our initiative, I'd like to
5 just clarify that our project doesn't focus just on plug
6 loads, but rather on several types of energy efficiency
7 actions or behaviors that can achieve energy savings in
8 residential buildings, so the purchase and installation
9 of energy efficient technologies, reducing waste,
10 shifting settings, and installing controls, or pairing
11 items, or performing maintenance, adjusting patterns of
12 use and habits, etc. Next slide.

13 So our funding is from the relatively new Federal
14 agency ARPA-E at Department of Energy, which is modeled
15 after DARPA, but focuses specifically on energy. And
16 then we also get funding from CEC. Our initiative has
17 about 20 different projects across 10 different
18 departments, and these departments range from electrical
19 engineering, computer science, mechanical engineering and
20 design, civil and environmental engineering, economics,
21 psychology, communications, education, behavioral
22 epidemiology at the School of Medicine, etc., so it's a
23 very diverse effort. All of the projects center around
24 how to leverage Smart Meter or other sensor data with
25 behavioral approaches to maximize energy phasing. Next

1 slide.

2 So our initiative attempts to address the
3 following problems: first, billions are being spent to
4 produce Smart infrastructure, but without careful
5 consideration of the human element, this infrastructure
6 is unlikely to reach its full potential; and second,
7 energy efficiency is difficult, so figuring out what to
8 do and how to do it is difficult and boring, often times.
9 So how can we address both of these issues? How can we
10 leverage Smart infrastructure to maximize energy savings?
11 Next slide.

12 Our solution is that a smart infrastructure
13 enables quantification, which in turn enables ways to
14 reduce energy use. So, for one, it enables diagnostics
15 for personalized recommendations so that people aren't
16 left guessing what they should do; second, quantification
17 enables a variety of behavioral techniques that were
18 difficult to implement before, for example, feedback,
19 incentives, markets, competition data, visualization,
20 etc., and third, quantification allows us to create the
21 best programs with unprecedented speed, ease, cost, and
22 scale, through objective evaluation of program energy
23 savings and then improvements of the programs over time
24 and their evaluation. Next slide.

25 So how can we achieve these and other benefits?

1 Our initiative links two technologies that have recently
2 become pervasive, the first, as I previously mentioned,
3 the wireless sensors, as indicated in the box on the
4 left-hand side of the Collect and Capture, so these could
5 be Smart Meters, Home Area Networks, gas sensors, gas
6 transportation sensors, hot water sensors, etc. And
7 then, the second technology indicated on the right in the
8 Present and Inform box is web enabled devices like
9 computers, Smart Phones, etc., which can deliver programs
10 to help individuals reduce energy use. We think that, by
11 linking these two through the Stanford engine or
12 initiative, we can realize significant energy savings.
13 Our engine is composed of a technology platform in the
14 red, which includes sensor and networking improvements
15 and a database on analytics. On top of that, in the
16 green, lives our programs or interventions, we have
17 multiple foundational projects, for example, identifying
18 target behavior for recommendations, doing segmentation,
19 etc., and then the programs themselves include media,
20 policy, and community programs, and I'm going to tell you
21 a little bit more about those in a minute. And then, in
22 addition, in the blue, modeling projects evaluate the
23 data from all of the programs to inform future work and
24 policy about which techniques and programs are most
25 effective, where to get the biggest bang for the buck,

1 building, modeling projects, etc. Next slide.

2 So I'll give a quick overview of several of the
3 projects now. I'll just say, we have some pretty sexy
4 projects and graphics, unfortunately, I can't show you
5 all of them today because I need to get permission from
6 the individual projects and I wasn't able to do that
7 quickly over the summer, but I think you'll get a bit of
8 the flavor for what we're working on.

9 So the graph that you see on this slide is a
10 piece of our simple feedback interface project. The data
11 is graphed compared to one's baseline in the past,
12 compared to one's neighbor's energy use, and the user is
13 also given recommendations and sent emails at strategic
14 times, etc., so this is sort of our basic feedback
15 interface, a piece of it. Next slide.

16 As an example for one of our media programs, we
17 have an online game that takes in real world energy use
18 data from Smart Meters into its point system, so this
19 game is called Power House, and the game, you'll see in
20 the graph on the left, the graph of energy use data, and
21 that's, like I said, converted into points, you can
22 compete with your friends in the game through Facebook
23 Connect, etc., and then embedded within the overall game
24 or website are smaller games, so, for example, in the one
25 illustrated on the right, you race around the house to

1 pick the tier to achieve all of the goals in your virtual
2 household with the lowest energy use possible, and in the
3 game, by speeding up time, and by seeing quick feedback
4 in the form of points, that actually are set up to
5 accurately reflect the energy consumption with the
6 different appliances in the game, one can more easily
7 develop habits, so you get reinforced more quickly. And
8 after playing, it's actually rather difficult to leave a
9 room without thinking about turning off lights and TV,
10 etc. So it builds up those habits more quickly. And
11 then within this overall framework, there's also game
12 challenges to reduce real world energy use, like I
13 mentioned. Next slide.

14 We have GLEE, Girls Learning Energy and
15 Environment, which is a Girl Scout Program that teaches
16 the girls about how to reduce energy use. We've just
17 finished implementing the program in 30 troops and are
18 analyzing the data. Half of the troops focused on
19 reducing home energy use, and the other half on
20 transportation and food energy use, and each group serves
21 as a control to the other. The program includes five
22 lessons at troop meetings and a corresponding website
23 which is shown here. At the end of each in-person
24 lesson, the girls create a news video to put on the
25 website, which is intended to draw the parents there,

1 where they can find additional resources related to audit
2 and retrofit programs, etc. etc. Next slide.

3 I'll quickly go through just a couple of other
4 behavioral projects, so one of our Facebook apps allows
5 one to use their energy savings to micro finance
6 individuals through Kiva. Our appliance calculator
7 allows one to easily compute energy costs of their
8 current appliances, as well as any appliance currently on
9 the market to determine when they should make the switch
10 to a new appliance, and what new appliance would be good
11 to purchase. We have a couple of incentives projects
12 that leverage behavioral economic principles to motivate
13 folks to shift energy use, for example, during off-peak
14 hours. Next slide.

15 To support these and other projects, we've built
16 an energy services platform that is a collection of
17 software services. We're hoping to make the software
18 available as a service to Program Developers outside of
19 our team in the coming months. The Energy Service's
20 platform allows Program Developers to easily implement
21 their programs, to assign participant to different
22 experimental conditions, to store various types of data
23 and perform analytics. Next slide.

24 I'm going to mention just one type of analytics
25 that we're working on, that I think is critical to

1 realizing energy efficiency savings, and which is being
2 implemented within the Energy Services Platform. These
3 analytics allow us to take whole home data like that from
4 Smart Meters, and separate it into appliance specific
5 information. We believe that appliance specific
6 information will allow individuals to quickly and
7 automatically identify the changes that would be most
8 effective in reducing their energy use. Studies show
9 that there's 200 to 300 percent variability in energy use
10 between identical housing units due to appliance
11 saturation and lifestyle patterns, and people don't know
12 where it would be most effective for them to make
13 changes. Once we identify what changes they should make,
14 we could recommend or channel them to specific rebates,
15 programs, etc. Next slide.

16 To tie the different pieces together that I've
17 described, we see that community programs like the Girl
18 Scouts and online social networking, etc., at the top,
19 can channel folks to the core analytics and
20 recommendation system indicated in red in the middle,
21 which then channels the folks to the bottom layer of
22 rebates and appliance replacement, or audit programs,
23 etc. The online game, Smart Incentives, and other media
24 programs we and others are working on are depicted in the
25 middle layer and can reinforce the recommendation system

1 and improve persistence in trying to make energy
2 efficiency changes. Next slide.

3 So, just to summarize, there's multiple benefits
4 that sensors such as smart meters could provide, some of
5 which I covered earlier like providing diagnostics,
6 motivating action with enhanced behavioral techniques,
7 and creating best practices for programs. There are
8 several additional benefits. So, the platform could
9 transform program evaluation and significantly increase
10 the diversity of energy programs, it would enable
11 utilities, government, and others to quantify reductions
12 in energy use attributable to a wide range of programs
13 whose impact was previously difficult to measure, thereby
14 diversifying the program toolkit. Additionally, the data
15 collected here and models derived from the data can
16 inform policy and also these programs, the hardware and
17 communication efforts that we're working on, can be
18 refined to be better, more usable to get energy
19 efficiency savings in the future. Next slide.

20 This is just a summary of everyone who is
21 involved currently on our team. I would just like to add
22 one clarification to my presentation because I did
23 mention Smart Meters a couple of times as being useful
24 and, just for the record, although they are -- the amount
25 of disaggregation that can be done at the current

1 resolution of data is fairly limited, and so we do have a
2 policy piece, a policy and technology paper that we're
3 close to finishing at this point that looks at what data
4 resolution, temporal frequency is needed to be able to do
5 different amounts of disaggregation. In other words, get
6 different numbers of appliances identified in the home
7 and the constraints of Smart Meters and what they should
8 be able to achieve and where we should push Smart Meters
9 in the future. Thank you.

10 MR. LEAON: Thank you, Dr. Armel. Will you be
11 able to hold on the line for the comment period?

12 DR. ARMEL: Yes, I will.

13 MR. LEAON: Okay, thank you. All right, let's
14 proceed to our final speaker for this panel, Jonathan P.
15 Williams, a Government Affairs Manager for Intel Corp.
16 Jonathan is responsible for developing, implementing and
17 managing public policy strategies for local, regional,
18 and state government entities and officials, developing
19 legislative priorities and positions on key policy issues
20 for Intel, while engaging and gaining support from senior
21 management, influencing and leading legislative activity
22 through participation in public policy committees,
23 specific and industry associations. Also, protecting and
24 enhancing the Intel brand and corporate reputation
25 through engagement and relationship development with

1 elected leaders and statewide stakeholders. Jonathan.

2 MR. WILLIAMS: Right, thanks very much. My
3 apologies for the heresy, I didn't bring slides; fear to
4 think anybody would bring slides, it would probably be
5 the guy from the high tech company. But being the last
6 person on the agenda, I'm not going to punish you any
7 further with a 27-slide deck, which is what I passed on.

8 I'm going to break my comments really into just
9 three parts, and I'm anxious to turn it over to the Q&A
10 because there's been so much on this panel that it kind
11 of dovetails with what I'd like to touch on.

12 First, let me just thank the CEC for the
13 invitation. I really appreciate Intel being thought of
14 in this context. We've been doing a lot of work in the
15 energy efficiency space over the last several years. I
16 heard semiconductors mentioned; the pace of the
17 semiconductor industry, I think you may have touched on,
18 is pretty exciting, and what we're doing with energy
19 efficiency, I think, is pretty exciting, as well, so I
20 appreciate being thought of in that context.

21 I want to thank the CEC specifically for the work
22 we've done recently with former Commissioner Byron and
23 staff and the consultants on Smart Meters, Home Energy
24 Management Systems, and Harinder Singh and Ken Ryder's
25 team for the work that we're doing with them right now on

1 battery charger requirements, both here and at the U.S.
2 DOE level.

3 Let me give a quick Intel infomercial, I'll tell
4 you a little about Intel, what we're doing from a
5 corporate perspective, from an energy efficiency and our
6 product perspective, and then I'll kind of take it to the
7 final piece of the remarks, which is kind of where we
8 think the industry can go, and it really fits in with
9 what you just heard on this panel.

10 From a company perspective, you may know that
11 Intel is the largest purchaser of renewable energy in the
12 U.S., we have been for the last four years, something
13 we're pretty proud of. We have the number one spot on
14 the EPA's Green Power Partner Program, something we're
15 proud of, and we're getting about 50 percent of our
16 domestic U.S. energy from renewable sources, which I
17 think is pretty impressive, considering we're a major
18 U.S. manufacturer. So, those are a few things about the
19 company from a corporate perspective that we're proud of.

20 But where Intel can make the biggest difference
21 is in our products, the energy efficiency that we can
22 deliver through our products, and a couple data points on
23 that before I get into some specifics. You look at the
24 number of installed -- the PC installed bases, we would
25 call it internally, basically the number of PCs globally

1 -- one billion in 2007; it's going to be two billion in
2 2014, right? But the energy consumed by that second
3 billion PCs is half of the energy consumed by that first
4 billion, a tremendous amount of energy efficiency
5 happening within our products today, and that's obviously
6 a good thing.

7 You look at what is happening in the server
8 space, right, in the enterprise, where you have in 2005 a
9 rack of 20 Intel Xeon servers, which is our standard
10 server processor, a rack of 20 of those is now being done
11 by a single -- excuse me -- 20 racks of Intel Xeon is now
12 being done in 2010 by a single rack. The energy
13 efficiency delivered through that, as well as the cost
14 savings for our corporate customers, is extremely strong.
15 Now, why is that happening? This is very intuitive, and
16 I think it will make sense as far as just your own
17 personal buying habits. From a consumer perspective, I
18 go back to - I've been with Intel for 14 years and one of
19 the jobs I had back in 2002 was the role of our Centrino
20 processor, if anybody remembers that. That was the
21 processor that basically had the integrated WiFi. And it
22 was the compelling notion at the time, was the integrated
23 WiFi, right? What that has engendered is, you know,
24 reduced battery consumption, greater energy efficiency
25 for all of the obvious reasons, right, because you want

1 that connectivity remotely, you don't want to be working
2 remotely and have a battery life of two hours, right, so
3 we've been driving greater energy efficiency and greater
4 battery life into our product for years and years and
5 years, just to meet the usage demands. Now, that's
6 happened with things like WiFi and other things, as well.
7 You look at Solid State Drives, if anybody is familiar
8 with Solid State Drives, as opposed to the traditional
9 hard drive, the spinning hard drive, right? Now, a
10 spinning hard drive, as you would suspect because it's
11 moving parts, consumes more energy; you move to solid
12 state drives, you're getting better battery life, you're
13 getting more energy efficiency. These things are all
14 happening right now and we're actually - I was on a call
15 earlier before I got here, we're having a hard time
16 making enough solid state drives to meet the demand, so
17 we're happy with what we're seeing in the market as far
18 as demanding the kind of energy efficiency that we've
19 been talking about today. Very briefly, at the server
20 level, what we're seeing from our customers at that level
21 is the exact same thing, you know, transistors,
22 microprocessors, continue to get faster, they continue to
23 get more energy efficient, and computing continues to get
24 smarter. At the server level, you see that through
25 things like virtualization, which is simply having

1 multiple servers, but being able to offload the work of
2 multiple servers onto a single server, simply through
3 software. And that's happening, and that's causing
4 significant energy efficiency, energy cost reductions, as
5 well as just cost reductions, in general, from having to
6 buy less technology, right, so these are all things that
7 are happening because of the product enhancements that
8 Intel is making, that the entire industry is making. And
9 it's a good thing in the context of what we're talking
10 about today.

11 So bottom line, though, as all that would kind of
12 suggest, the best way to drive enhanced energy efficiency
13 is to upgrade those older systems, right, if you're
14 working off of systems, you know, CRT monitors, right?
15 Simply moving to flat screens, as all of you know, is
16 significant energy savings with that, right? Getting off
17 of an older system that isn't being effectively managed,
18 where it's, you know, the intelligence of computing where
19 it knows you've left because, you know, it'll shut down
20 after two minutes, it'll go into hibernation after a
21 couple minutes if you're not using it. That kind of
22 intelligence can be managed into newer systems, and if
23 you're managing a large enterprise environment, you know,
24 an upgraded set of systems will deliver energy efficiency
25 through that kind of intelligent computing. So, those

1 kinds of things are all happening in the market today.

2 What -- and this really fits in, I think, most

3 specifically with the last comments -- what else can

4 happen? You know, where is the technology going that is

5 outside of the context of maybe the more traditional

6 technology roadmap that I've just touched on? What we're

7 seeing is Intel has been involved in a few different

8 programs I think are particularly interesting, and I just

9 want to share very briefly with this audience, 1) in

10 France, we're working with a consortium of companies on

11 developing positive net energy buildings, buildings that

12 aren't zero energy, but they're actually generating

13 energy. And this is a result of some regulations in

14 France that are about a decade or so away. And what

15 we're seeing that I think is most compelling is, without

16 the buy-in of the users within the building, you're not

17 going to get there, right? It has to be at that

18 individual user level. No amount of energy efficiency at

19 the appliance level, or kind of building regulation

20 level, is going to get you there unless you have the buy-

21 in of the users and the people within that building. And

22 that's been a pretty compelling message from the research

23 we've done. We're also involved with the Oregon

24 Sustainability Center, which is a really neat public-

25 private partnership. I lived in Oregon for about 10

1 years, and I know this one pretty well. The idea that
2 Oregon is designing what they're calling a "Living
3 Building" that is trying to get to zero net energy, as
4 well as some really cutting edge sustainability efforts
5 around things like water re-use, right? And we're seeing
6 the same thing there, without getting the buy-in of the
7 users to take, you know, you can get double-digit energy
8 efficiency gains through managing the users and helping
9 them understand ways to deliver energy efficiency at the
10 micro level. And the way we've been talking about it
11 internally, and actually I heard something very similar
12 to this in the last presentation, making energy personal.
13 Making it a personal thing that you think about. And
14 we've developed a software application that we've just
15 recently rolled out early this month, actually, called
16 the "Personal Office Energy Manager," POEM is the
17 acronym, of course, and anybody in high tech knows
18 everything gets an acronym. The Personal Office Energy
19 Manager is a software application that you can install
20 for your users, where they can track their own personal
21 energy consumption as it relates to the use of their
22 system, the use of the printer. They can weigh in on how
23 they feel about the office climate, and that data can be
24 aggregated at the floor level, the building level, and
25 there's any number of incentives that you could introduce

CALIFORNIA REPORTING, LLC

52 Longwood Drive, San Rafael, California 94901 (415) 457-4417

1 to help folks understand ways that, you know, their own
2 personal energy fits into the energy use of the other
3 folks in that building.

4 I heard some comments on the prior panel toward
5 the very end that I thought were really interesting, the
6 idea of peer pressure vs. just kind of increased
7 awareness, and I wouldn't go to the peer pressure sense
8 of it because I don't think that's the right mechanism by
9 which to view this, but having a better familiarity with
10 kind of your own environment, in how folks on the same
11 floor as you, how they're doing. You know, I believe in
12 technology and I believe in technology's ability to
13 increase user control, user awareness, and give folks
14 more clear understanding of their own personal energy
15 usage and how they can do a better job managing it. And
16 I think that's the real promise of technology as far as
17 kind of going beyond the kinds of standards that we
18 traditionally talk about. I think there are
19 applications, there are software applications that are
20 being developed today, you just saw some in the earlier
21 presentations, and in the work that we're doing with this
22 Personal Office Energy Manager. These things are
23 happening, they're being developed today, and I think
24 they're going to create this new area that we haven't
25 traditionally looked at that is really going to be an

1 opportunity to drive the kind of energy efficiency that
2 we're most interested in.

3 Two last things and then I'll turn it over to the
4 discussion. We're doing similar work in China, and the
5 reason I simply say that is because there's really global
6 interest in this and we think we're going to try and
7 deploy somewhere on the order of 30 million Home Energy
8 Management Systems over the next five years in China to
9 help the Chinese market better understand their energy
10 usage, so we're particularly excited about that. And
11 lastly, you know, Intel has got a venture capital arm,
12 many of you may know, and we've invested more than \$150
13 million in about 20 clean tech companies that are doing
14 everything from solar to battery technology, to the kinds
15 of software that help lead to the things like this
16 personal office energy manager. So our interest in this
17 is extremely broad. We're pretty proud of what we're
18 doing from a product perspective, but also in these kind
19 of cutting edge areas, and I will be happy to turn it
20 over to the discussion and take some more questions on
21 that.

22 MR. LEAON: Thank you, Jonathan. I want to thank
23 all of our panel members for their thought provoking
24 presentations, very informative, and I think there was
25 some common themes there that we can discuss during the

1 open discussion period here.

2 To begin with, I guess I'd like to start with a
3 question to the panel about key challenges. In the draft
4 staff report for the appliance program, specifically, one
5 of the key issues that we identified within the framework
6 of our regulatory program of standards compliance and
7 enforcement, related directly to enforcement authority
8 and the need to have greater enforcement authority than
9 we currently have under statute. We have found through
10 market survey reports that there is a high degree of non-
11 compliant products entering the marketplace in
12 California, so obviously a key going forward and meeting
13 efficiency goals for buildings is to capture the energy,
14 all of the energy savings we should be capturing. And
15 the one recommendation that's currently in the draft
16 report relates to that, asking for a fine in a citation
17 authority, and there is a bill in the Legislature right
18 now that would provide that authority, Senate Bill 454.
19 And we think, in terms of capturing all the savings we
20 possibly can, that's going to be a key thing for us to
21 have moving forward within our existing program.
22 However, during the presentations, I think it's clear
23 that there are a number of themes that are emerging that
24 are not necessarily something we can address through our
25 existing program, whether it's a smart technology,

1 whether it's addressing public acceptance, whether it's
2 engaging the public to change their behaviors and find
3 ways to get them involved in managing energy.

4 So, I guess the question I would like to pose to
5 the panel is, what do you see as the key challenges
6 moving forward in regard to managing plug loads? And
7 it's not clear to me that, necessarily, all of this can
8 be addressed within our existing regulatory framework.

9 DR. LI: Maybe I can jump in first. We had one
10 behavior study conducted in our university with the
11 residential area, so what we found out in that study is
12 we collected a lot of information, but the information
13 somehow cannot be easily understood by the users; for
14 example, when we presented data to them, a kilowatt hour,
15 that's the typical unit we used, and the user was asked
16 the question, "Kilowatt hour? Kilowatt what?" They said
17 they do not understand that unit. When we explained to
18 them one kilowatt hour equivalent to a double cheese
19 hamburger, 860 calories, and your home is eating more
20 hamburgers, they understand it. So the question here is
21 how do we really present the information to the users so
22 that it can be easily understood. And we have lots of
23 sense of technology and Smart Meters, and so on, the
24 information how to present the information, and the user
25 can use that information as a way to make actionable

1 information, and they can make decisions, and so far we
2 have not reached that level yet. We are at the very
3 beginning of really solving the problem, so that's why I
4 think it's having the consortium and industry, utilities,
5 and Energy Commissions, and universities, and so on, we
6 work together. And I think, especially if we're talking
7 to the K through 12 students, that is the opportunity for
8 us, they are the angels, they are the agents of change,
9 and somehow if we present the information in a way they
10 understand, so "a hamburger is obesity," and "there is an
11 obesity issue in our society," and they can understand
12 that. They can personalize that information. And we
13 have not done the work yet. So I think this is a really
14 tremendous opportunity for us to really embark on that
15 problem, and it will also create new markets for all of
16 us.

17 MR. PENNINGTON: Thank you, Dr. Li. I think from
18 our perspective at the Energy Commission, one of our
19 challenges is in this era of resource constraints,
20 budgetary constraints, we're really focused on our core
21 activities of developing Standards, ensuring compliance
22 with those Standards, and enforcing those Standards. And
23 I think the area where we're venturing into is the need
24 for collaborative approaches to do education and
25 outreach, and that is certainly an area where we would

1 like to do a lot more, but again, we're challenged by
2 resource constraints. So, let me ask this question, and
3 one of the things I think we should be looking at are,
4 what are the opportunities out there to establish
5 collaboratives, to work on outreach and education?

6 MR. WILLIAMS: So I'll jump in and at the risk of
7 this sounding awfully self-serving, from a computing
8 perspective, you know, two percent of the global carbon
9 emissions have been attributed from outside analysts to
10 information in computing technologies, right? Leaving 98
11 percent among the wide other sectors, but the data has
12 also shown that every one additional kilowatt hour
13 associated with computing leads to a 10X increase in
14 energy efficiency in kind of reductions in other
15 computing, you know, referencing your slides, you show
16 the medical technologies and, you know, the emergence of
17 those, what are the -- and you hit on, I think, the exact
18 issue -- how do you measure the energy savings that are
19 delivered because more people are able to get care at
20 home? Right? You know, we think they're tremendous. I
21 think there's a lot to be learned, not just from a
22 healthcare cost savings perspective, but keeping cars off
23 the road, keeping people out of hospitals, keeping people
24 in their home where there's a greater likelihood that
25 they won't need urgent care and tap into all kinds of

1 additional costs associated with that. But studying
2 these kinds of emerging technologies, having the data, is
3 something we struggle with and, if we're struggling with
4 it, I can imagine that regulators are struggling with it
5 significantly. Right? So I do think there's a
6 tremendous opportunity to work more closely with the
7 private sector to understand where we are going and where
8 the technology is going. I liked your line, as well, you
9 know, the pace of change in the industry continues to
10 surpass the ability to keep up via regulation. Right?
11 It's just really hard to do that. We understand that.
12 I've seen that my entire career at Intel. The idea,
13 though, that we could work more closely together to
14 understand, you know, the significant accomplishments
15 that have been made through energy efficiency and where
16 the critical mass may lie, outside of the traditional
17 energy efficiency models, right? Because we think the
18 pace of energy efficiency in the computing industry has
19 been extremely rapid, you know, estimates as much as
20 3,000 percent increases in energy efficiency over the
21 last 30 years for computing. There's no other industry
22 in the world that can match the computing industry when
23 it comes to energy efficiency. The gains and the savings
24 have just been completely enormous. So that being said,
25 how do we take the power of computing to deliver energy

1 savings across the broader industry? That's actually, I
2 think, the most exciting challenge that we've been
3 looking at internally. And we've done some very good
4 work with the CEC, we've done some very good work through
5 PIER, we think there's tremendous opportunities through
6 the initiatives that are being established and absolutely
7 would like to work more closely with this agency to help
8 understand where we're going.

9 DR. ARMEL: I had a response to the question
10 posed -- I don't know if somebody wants to respond to
11 that, but I was going to respond to a question posed by
12 the moderator --

13 MR. LEAON: Yes, go ahead.

14 DR. ARMEL: -- about you had mentioned
15 collaboratives that could be established to make better
16 user leveraged funds. And I had a question, perhaps this
17 is an inappropriate place to mention this, and forgive me
18 if it is, but my understanding is that the Public
19 Utilities Commission provides repair dollars in three-
20 year cycles to use utilities for utility programs related
21 to energy efficiency, and I've done a little bit of
22 inquiring as to how those funds get allocated and stuff,
23 but it seems like, at least I'm finding it sort of
24 complex and difficult to figure out, you know, how that
25 works, and I wonder if perhaps -- I don't know if there's

1 anybody there from the PUC, or whether folks from CEC
2 have some insight on this, but whether some of that
3 funding could actually be potentially opened up for
4 research or other initiatives that might kind of expand
5 the scope beyond the more traditional utility programs.

6 MR. LEAON: Let me ask our utility reps if they
7 can respond to that.

8 MR. HIGA: I'm not sure if I completely
9 understand the question. Its funding for doing more than
10 the traditional incentive programs or...?

11 DR. ARMEL: No, I think this is funding that is
12 typically earmarked and there's three-year cycles, and I
13 guess we're about half way through one currently, and
14 there's talk of having a lag time of about a year when
15 this cycle ends, before the next cycle begins, and
16 there's discussion now between the utilities and the PUC
17 about for the next cycle where those funds should get
18 allocated for a utility program. I apologize that I
19 don't have a way of referring to it as a specific type of
20 program, I'm not -- the process is somewhat enigmatic to
21 me. This is for marketing dollars, education dollars
22 related to energy efficiency.

23 MR. HIGA: Right, well, there is, I think, I'm
24 not sure if you heard some of the previous presenters
25 from the CPUC, but there's a Workforce Education and

1 Training Program that currently exists that does address
2 a lot of these training types of issues. That being
3 said, you know, the next program cycle has -- the
4 planning for that has not begun yet, so I think any input
5 that you have to what the Workforce Education Training
6 Program consists of and what are its program elements,
7 I'm sure that there will be, you know, input would be
8 welcome. I'm sure there will be upcoming workshops that
9 will be noticed, you know, in the upcoming future, and I
10 don't know if there's anybody from the CPUC on the line
11 right now that also wants to address that.

12 MR. STRAIT: Cathy Fogel did have her hand
13 raised, she may have some contribution to this subject.

14 MS. FOGEL: Can you hear me?

15 MR. STRAIT: Yes, we can.

16 MS. FOGEL: Yeah, thanks for your question,
17 Carrie. I can give a brief response and I'm happy to
18 meet with you separately, as well. Yeah, I work at the
19 CPUC and I find the whole process fairly confusing, as
20 well, so you know, I'm joking a little bit, but it is
21 something that is a problem because it's so challenging
22 for people who aren't deep into it to understand this,
23 but as Randall mentioned, we are beginning to plan for
24 our sort of guidance that the CPUC will be providing for
25 the next program cycle, and most of the what's called

1 "Record Development" needs to take place in about the
2 next nine months for that, which means new ideas, report
3 information, data that would inform the Commissioners
4 guidance need to get formally into our proceeding record
5 in that time, so it's really what the previous speaker
6 was talking about, how the marketplace moves just much
7 more quickly than the regulatory framework is really able
8 to accommodate, and this issue of, you know, particularly
9 the behavior programs, which is really just kind of
10 exploding what's possible coupled with competing
11 technology. You know, I think it's a challenge for us to
12 figure out how to get these innovative programs assessed
13 and funded, whether that's via the utility programs, or
14 via third-party programs, or via some other mechanism,
15 there's also potentially -- research could potentially be
16 conducted on behavior-based programs in the utilities'
17 emerging technologies programs.

18 And I kind of had a question back for Carrie,
19 although I don't want to dominate the conversation of how
20 are some of these behavior change programs -- how do the
21 researchers currently see them to be best implemented?
22 Because utilities, not to mention the regulatory
23 agencies, are pretty slow moving beasts, we're not really
24 known particularly for innovation over the years, so do
25 you foresee these being implemented by utilities, or by

1 other third parties? And do you see them mostly as
2 marketing and education initiatives, as you mentioned?
3 Or getting into this [quote unquote] "savings framework"
4 that the CPUC currently has for utilities, in which we
5 have adopted goals, savings goals that they have to meet?

6 DR. ARMEL: I would think it could definitely be,
7 especially with the measurement component, related to the
8 work that I mentioned, that work that has a strong
9 measurement component could fit into the latter type of
10 programs that you referred to. The utilities, I agree
11 that they're slow moving, we've had a lot of interactions
12 with them and there's been strong interest, but our stuff
13 seems a little bit outside the envelope to some, I guess.
14 So I don't know, there's been some interest in perhaps
15 pilot programs with the utilities, we're independently
16 doing kind of direct recruitment to folks, tapping into
17 diffusion channels like the Girl Scouts and other
18 channels. I think there could be a role for energy
19 services companies, or companies like EnerNOC and CPower,
20 so I think there's a variety of channels, and I don't
21 know whether the PUC funds are tied specifically to the
22 utilities, or whether they're open to other channels, as
23 well.

24 MS. FOGEL: Yeah, they are open to other
25 channels, as well. Twenty percent -- currently, the

1 policy rules state that 20 percent of the funding needs
2 to go to non-utility programs.

3 DR. ARMEL: Okay, well, maybe we should continue
4 the conversation offline and I would be curious because
5 I've come across also some other entities doing really
6 interesting stuff that might be useful for you to be
7 aware of, maybe we could organize like a lunch meeting
8 where I could get some groups together to come up and do
9 presentations to expose the PUC, if that would be useful.
10 I'm not sure of the best mechanism, but perhaps we could
11 have another call and you could make some
12 recommendations?

13 MS. FOGEL: Sure, that would be great.

14 DR. ARMEL: Super.

15 MR. LEAON: Okay, thank you. All right, let me
16 ask if there are any comments in the room at this point?
17 Okay, if you could state your name, organization, and
18 please provide a business card for the Court Reporter.

19 MR. RAYMER: Okay, thank you. I'm Bob Raymer,
20 Senior Engineer with the California Building Industry
21 Association. And my comments will focus on plug load,
22 but then lapse back into energy efficiency and zero net
23 energy. One of the cost concerns that we have right now
24 is, under current technologies, there's rather high costs
25 projected for reaching Zero Net Energy. And a big chunk

1 of that is the size of the PV system that needs to be put
2 on the roof to account for the plug load. And so,
3 obviously it behooves us over the next eight to 10 years
4 to do everything we can to reduce that plug load.

5 Now, getting into the energy efficiency
6 standards, we're in the middle of probably historically
7 large increase in stringency that the CEC will probably
8 be proposing quite shortly. And we're seeing out in the
9 field compliance with the performance methodology, the
10 performance compliance approach for the standards is by
11 far the one that is most commonly used. I would have to
12 say that probably 98 percent of the homes that comply
13 with the Energy Regs use the performance approach.

14 One of the things we need when we're looking at
15 the Standards is we need compliance options. Now, the
16 measures that create that performance budget that we have
17 to meet are arrived at through looking at what is put
18 into the proscriptive packages for each of the 16 climate
19 zones, and I know this kind of gets into the minutiae of
20 the Energy Efficiency Standards, but in this particular
21 go-round, a great many of the compliance options that
22 we've been using for the last three to six years are
23 being moved out of the compliance option column and over
24 into the proscriptive column. And so, although you can
25 still do tradeoffs, there's far less over in the

1 compliance option column that we can tradeoff anymore.
2 And so, to the extent that the Energy Commission can
3 somehow quantify certain benefits of either appliance
4 efficiency on things that were not currently regulated,
5 or plug load methodology systems, plug load reduction
6 devices, there could be a great market right away within
7 the next two to two and a half years. In essence,
8 industry is going to want to reduce that plug load, it is
9 in our best interest from a cost perspective to reduce
10 the plug load. And if we can somehow early on through
11 the energy efficiency standards somehow get compliance
12 credit for tradeoffs with other provisions that we may
13 not be able to do for the marketable home, that's going
14 to be very helpful. And so there is a marvelous
15 opportunity within just the next 24 months. So, with
16 that, we'd be very supportive of that kind of effort.

17 MR. LEAON: Thank you. Other comments in the
18 room?

19 MR. NESBITT: George Nesbitt. So plug loads have
20 definitely been an ever increasing problem and a
21 difficult one to address. Some additional items. Home
22 exercise equipment, of course, it's also in places people
23 pay to go to, to exercise, so you've got treadmills with
24 fans that you can obviously hear running, even though no
25 one is on the treadmill and hasn't been on them for a day

1 or more, who knows? And also, you know, we now have home
2 theaters in every room, so the media centers, the DVRs,
3 the TiVos, the satellite boxes, and one is not enough,
4 we've got to have one everywhere, so it's a big problem.
5 So we need to address it as we can from Title 20, you
6 know, basically anything that is plugged in shouldn't be
7 using energy when it's not producing anything of value.
8 I mean, there's just really no reason. From the
9 behavior, or what I sometimes try to refer to as
10 "operational" comes to -- none of my plug loads are
11 plugged in unless I'm actually doing something with them,
12 so if I'm not charging my cell phone, my computer, what
13 not, it's usually not plugged in. And that comes down to
14 a human choice and a human action, which is harder, but I
15 think there's a lot of effort in some of these feedback
16 things that will help.

17 I think lighting is in some ways residentially an
18 under-appreciated increasing load. My house has one
19 light fixture in the center of every room, I cannot go
20 into a house that's been remodeled that does not have a
21 half a dozen recessed lights in the kitchen, or the
22 bathroom, or the living room, or the dining room, or the
23 master bedroom suite. So, I think as part of the Code
24 update, I think there is more wattage in the average
25 California kitchen from the survey they did than there is

1 total wattage in my whole house. So, I'm 100 percent
2 CFL. I haven't figured out how to disable my oven light
3 yet, I just haven't been able to get the damn thing apart
4 to disable it. And through the day, people have said, to
5 get to net zero, we obviously need to consider more than
6 just the physical building, it's everything in it.

7 So under our definition of "Net Zero," which we
8 defined three years ago on HERS 2, we do include the plug
9 loads and the lighting. And we need to really make that
10 essentially the Code. I mean, we need to roll the rating
11 system into the full Code and include those plug loads
12 and the lighting and allow tradeoffs. Although,
13 currently you get no credit for having an energy
14 efficient top loading washing machine. And then we'll
15 have to ask the question if non-res has plug loads, but
16 there's nothing you can do to gain credit in it as far as
17 I know, so then the question will be do we need a way to
18 have credits. You know, what kind of technology or
19 systems would we allow that would generate some sort of
20 credit that somehow hopefully enables you to reduce your
21 plug loads? So that really needs to be a part of that.

22 I think people think, well, Net Zero is -- it's
23 very abstract to everyone right now. My 1923 house
24 upgraded will only need about a .9 kilowatt PV system to
25 reach Net Zero under our definition, which is not

1 humongous, although to get there you've got to be at
2 least 50 percent above Code.

3 And then I think the other thing, you kind of
4 mentioned above Code programs. One of the difficulties I
5 think we have as we ratchet up the Code, we've also got
6 all these programs that are pushing beyond Code -- Green
7 rating, the new CalGreen, various REACH Codes that are
8 allowing jurisdictions to adopt even greater levels of
9 above Code, and if we're going to ratchet up the Code by
10 30 percent, which really means for a lot of people we're
11 ratcheting it up by even more, and so at some point there
12 is no REACH. Because, like I say, I don't think you can
13 get above 75 percent above, I just -- I've done enough
14 modeling that at the moment there's just nothing more to
15 throw at it to get above that, so there is a limit to how
16 far above our current baseline we can get. And at some
17 level, we have to have some room above it if we're going
18 to have REACH Codes, or maybe then the Code just becomes
19 the bare minimum again, although we've just raised the
20 bar real far.

21 MR. LEAON: Okay, thank you.

22 MR. STONE: Nehemiah Stone with Benningfield
23 Group. Something you said, Randall, really intrigued me
24 because I hadn't thought about it before, but it seems
25 pretty obvious; to the extent that California is

1 prevented by preemption from going beyond the appliance
2 standards, the Federal Appliance Standards, it's going to
3 be difficult to get to Net Zero. But it also started me
4 thinking, we were preempted from water heater standards
5 years ago when it was set really low at .52 energy
6 factor, and what we did in the Code, in the Building
7 Code, was to say, "Well, yeah, you can put that in, but
8 if you do that, you're going to have to put a blanket, an
9 insulating blanket on it." And that did not change the
10 appliance regulation, but it effectively changed what the
11 minimum water heater was that people installed.

12 The parallel here that I'm wondering about, if we
13 don't ask for any higher levels of efficiency for washers
14 and dryers and whatever else, but we do say, "If you're
15 going to sell them in California, they need to have
16 controls in them, Smart controls that will communicate
17 with a building EMS," that allow you to make the choice
18 to have it turned off when you don't want it on, then I'm
19 wondering if that is not in conflict with the Federal
20 preemption because we're not saying anything about the
21 efficiency, you can still operate that same efficient
22 equipment, it's just in California it has to be able to
23 be turned off if you choose to set your system up to do
24 that. I'm wondering if you can respond to that, Randall,
25 or if that has to be punted to the Energy Commission, and

1 particularly maybe to the attorney that is handling
2 waivers and preemption issues these days.

3 MR. LEAON: This is Mike, yeah, I think we would
4 have to look at that. It's an interesting concept and I
5 think it's one that is definitely worth investigation.

6 MR. HIGA: Yeah, I'll reiterate, you know, the
7 example that I had before is that, you know, on task
8 lighting, you know, we're trying to figure out a way to
9 regulate task lighting in offices and it's hard to do
10 that as a plug-in device, but one of the things we
11 thought about, and I worked in an office that had this,
12 and that is at night time, certain outlets were swept off
13 which the test lights were plugged into, so we want to --
14 and I just think that's good practice and has been good
15 practice for 20 plus years, so I think if we could
16 facilitate that type of control in offices in the Code, I
17 think that would be an opportunity. So, certainly the
18 water heater blanket is a good example. The other one is
19 the economize on air-conditioners. We cannot require
20 homes to have anything higher than a SEER 13 or you can't
21 have a home -- you have to make it comply with the SEER
22 13 air-conditioner. And the same goes for larger air-
23 conditioners, there's also efficiency limits on where you
24 can go, but in California, we could require economizers
25 to put on there. So we're looking at other ways of

1 retrofitting. As John knows, we're looking at putting on
2 variable speed drives on evaporator fans and
3 refrigeration units, and things like that. So I think --
4 the point, though, is we're looking at all possible ways
5 to drive down energy use and not run into preemption
6 issues. And I think there are some creative ways we can
7 do that, we need to explore that more.

8 MR. MCHUGH: Hi. My name is Jon McHugh.
9 Actually, some of the things that have just been
10 discussed are things that we're looking at right now for
11 the Title 24 Standards in regards to plug load controls,
12 so either scheduling controls, or other controls where
13 you have a single point of control that controls, you
14 know, half the plugs in the house. And I think this goes
15 back to what Bob is talking about, are that there are
16 additional opportunities and potentially tradeoffs. And
17 one of the issues with having additional control that I
18 think impacts potentially the appliance standards,
19 especially for a lot of consumer electronics that are
20 currently not covered, is the issue of what Dr. Li
21 brought up earlier about the issue of the clock, and the
22 issue is, you historically, "Oh, we've got to keep the
23 juice to our microwave, otherwise I'm going to have to
24 reset the clock and all the settings, and the VCR, and
25 everything else." And so, from a perspective of

1 appliance standards, I think that's actually a pretty
2 ripe opportunity to look at sort of the interaction
3 between exterior controls that might be applied through a
4 building standard that's actually providing intermittent
5 electricity, or intermittent power to the device, and
6 that it maintains all of its functions. And my
7 understanding is that there is currently a proposal in
8 front of Title 20 that removing the standards from
9 lighting controls, which used to be in Title 24 into
10 Title 20, and those have a series of requirements about
11 non-volatile memory that perhaps makes sense for a much
12 broader range of appliances beyond just lighting
13 controls.

14 MR. LEAON: Okay, thank you. Well, we're
15 approaching the end here. I would just like to remind
16 everyone that -- oh, Pat, I'm sorry, let's get to you
17 before I make a closing statement.

18 MR. EILERT: I'll be just really quick. You
19 know, preemption -- I just want to emphasize this issue
20 -- and you look at the example Kosta threw up a little
21 while ago which is we're sitting on a 45 lumen per watt
22 standard for general service lamps in 2018, that's sort
23 of ridiculous, okay, that and you can name sort of a
24 dozen other examples where we could go to more stringent
25 standards for various appliances and plug loads in the

1 state, sooner than that. It's a huge problem long term
2 and, you know, sooner or later every major end use is
3 going to be covered at the Federal level with sort of,
4 again, ties our hands here in California. So, we need to
5 develop some sort of collaborative between the State
6 utilities industry to figure out what we can do here in
7 California to maybe figure out some sort of approach
8 that's actually interesting to industry by, you know,
9 turning California into some sort of a policy laboratory
10 where -- and figure out what's the value to having a
11 state like California step out ahead of the nation in
12 terms of energy efficiency in more of a general sense and
13 not just on a measure-by-measure sense. We need to think
14 a little bit more broadly about this issue because, right
15 now, you know, we're really stuck, we're not going to get
16 to Zero Net Energy in a cost-effective manner and a lot
17 of the other state goals are going to be a lot harder to
18 reach their preemption, you know, the lighting goals, as
19 well.

20 MR. LEAON: Thank you, Pat. Okay, I want to
21 thank our panel members today, and I want to thank the
22 audience, those in the room and those on the phone. I
23 thought it was a very productive workshop today. I would
24 like to encourage Stakeholders to submit written
25 comments, they are due July 29th. The Workshop Notice has

1 the directions for how to submit your written comments.
2 Electronic comments have to be supported by 10 copies of
3 written comments, so take a look at the notice on
4 directions on how to do that.

5 I would also like to provide the audience a heads
6 up that we are -- the Energy Commission will be moving
7 forward with a new Scoping Order for developing Standards
8 for appliances, we're wrapping up the battery charger
9 proceeding, and we anticipate we'll be noticing the
10 formal rulemaking sometime next month, start the 45-day
11 public comment period for that, and we are also planning
12 on holding a Scoping Hearing sometime in August to
13 discuss which appliances should be addressed next in a
14 proceeding for new Standards. With that, that concludes
15 the workshop and, again, thank you everyone for
16 participating and -- well, I see we have one more
17 question in the room here. So let's go ahead and take
18 that.

19 MR. STRAIT: Cathy, your hand is still raised.
20 Di you have an additional comment you wanted to make?

21 MS. FOGEL: No, not me.

22 MR. LAEON: All right, just checking. Thank you.
23 Okay, that concludes the workshop. Again, thank you,
24 everyone, for participating, in particular our panel
25 members.

(Adjourned at 4:55 p.m.)

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

REPORTER'S CERTIFICATE

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

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF,

I have hereunto set my hand this 16th day of November, 2011.

A handwritten signature in cursive script, reading "Peter Petty", is written over a horizontal line.

PETER PETTY
CER**D-493
Notary Public