

BEFORE THE
CALIFORNIA ENERGY COMMISSION

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

APPEARANCES

Staff Present:

Panama Bartholomy
 Martha Brook
 Mike Leaon
 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 PresentPublic 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 Present

Public Comment

*Jim Jungwirth

Jim Francisco, Sierra Consulting

Jelisaveta Gavric, California Association of Realtors

Robert Raymer, CBIA

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.

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

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

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

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

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

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

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

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

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

24 We are then going to move on to a discussion,
25 right after lunch, on achieving energy efficiency in

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

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

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

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

1 staff that worked to bring this group together today, I'd
2 really appreciate it.

3 [Applause]

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

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

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

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

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

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

1 minutes.

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

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

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

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

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

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

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

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

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

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

1 shift when we think about building energy consumption and
2 building energy efficiency.

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

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

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

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

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

24 So, just assuming that we have to meet that it's
25 very challenging because one of the things about that

1 trend line is that it already assumes that we're going to
2 be doing all of the things we have been doing
3 historically for energy efficiency in the State.

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

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

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

25 So, that sort of sets the stage for what we want

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

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

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

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

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

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

21 MS. BROOK: We can.

22 MS. CAMARATA: Okay, excellent.

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

25 MS. CAMARATA: Sure thing.

1 MS. BROOK: Thank you. Well done. Okay, Jordana
2 Camarata is the Senior Regulatory Analyst in the Demand
3 Side Program Branch at the California Public Utility
4 Commission.

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

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

12 And now we have Jordana.

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

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

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

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

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

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

1 specifically talking a little bit about the Commercial
2 Building Action Plan that we have.

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

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

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

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

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

1 kind of Title V.

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

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

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

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

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

24 Basically, the definition we have on zero net
25 energy is that the amount of energy provided on site by

1 renewable energy sources is equal to the amount of energy
2 used by a building annualized over a year.

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

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

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

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

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

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

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

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

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

23 So, the strategic plan sets forth these D&E goals
24 and, like I said earlier in the presentation, that
25 vision, that road map, the utilities use that road map to

1 kind of align and come up with some innovative programs
2 for this upcoming -- for this current, actually, program
3 cycle, 2010 through 2012. I know Peter will be talking
4 about the PG&E pilot.

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

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

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

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

1 to build them out a little bit further.

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

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

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

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

1 describe this later, and find out what kind of activities
2 we need to do to achieve those strategies. So, right now
3 I'm just going to be talking about the first three.

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

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

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

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

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

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

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

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

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

1 This one is also extremely important to help us
2 get to zero. There's a lot of non-regulated energy loads
3 in buildings and those definitely pose a threat to zero
4 net energy goals.

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

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

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

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

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

24 So, these are just slowly kind of chugging along
25 until the codes are actually updated and then this will

1 probably start all over again with the new code cycle.

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

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

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

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

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

1 And so this strategy's focused on kind of
2 building demand and education and awareness.

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

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

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

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

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

1 action plan as we build on it.

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

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

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

19 So, thank you very much.

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

24 MS. CAMARATA: Absolutely.

25 MS. BROOK: So, next up we have -- first, I'm

1 going to get to Jon's slides and then I'll introduce him.

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

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

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

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

16 Jon has helped developed or upgrade energy codes
17 for Colorado, Canada, ASHRAE 90.1 and California's Title
18 24.

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

23 Thanks Jon.

24 MR. MC HUGH: Good morning. So, I thought that
25 I'd start off with sort of the rationale behind ZNE

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

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

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

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

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

25 You know, we might think of California as a green

1 state, but our air certainly isn't. And, you know, we
2 have essentially the worst air quality in the United
3 States.

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

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

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

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

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

1 efficiency by 10 or 15 percent.

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

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

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

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

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

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

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

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

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

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

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

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

1 effects and, you know, the overall effects of
2 environmental degradation.

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

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

20 And so the language here, that I have posted, is
21 the language extracted from the Big, Bold Energy
22 Efficiency Strategy. You know, the primary one's about
23 all new residential construction being zero net energy by
24 2020, commercial by 2030.

25 And then the definition that says the amount of

1 energy provided by on-site renewable energy sources is
2 equal to the amount of energy used by the building. And
3 it also indicates that ZNE may also include embodied
4 energy.

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

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

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

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

1 Do we use other definitions that might include
2 societal costs of energy?

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

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

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

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

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

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

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

25 So, those are some of the kinds of questions that

1 we wanted to address.

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

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

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

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

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

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

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

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

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

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

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

25 And it should be noted that equivalency was sort

1 of in the original goal and that for the existing
2 buildings it says that 50 percent of the buildings will
3 be equivalent to zero net energy.

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

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

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

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

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

1 defining what that property is.

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

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

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

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

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

1 paying into the energy bank for the amount of energy that
2 was used in the concrete, and the foundation, or
3 something like that.

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

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

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

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

1 And in some cases you have to make some
2 assumptions about what is a typical plug load when you
3 don't have that information.

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

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

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

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

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

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

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

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

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

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

24 And so there are various metrics, we've talked
25 about the site and source, et cetera, and societal cost.

1 Here's some other ones, grid neutral, carbon neutral.

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

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

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

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

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

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

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

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

24 It ignores the concept of thermodynamic quality,
25 which is that it took a lot more energy to make each one

1 of those kilowatt hours than it does for -- to make 3,000
2 BTUs of natural gas. You know, the reality is that since
3 it does have a higher quality if you treat it -- if you
4 treat those different energy sources identically, it
5 creates some distortions, including things like, you
6 know, potentially using electric resistance for water
7 heating, which I don't think the State -- you know, we've
8 done some things where the State doesn't really want to
9 follow that policy choice.

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

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

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

24 I've got one minute, okay.

25 And encourages fuel -- so, anyway, there's pros

1 associated with it.

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

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

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

1 cost of energy that's used for evaluations of efficiency
2 programs.

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

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

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

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

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

1 MS. BROOK: Okay. That was very, I think,
2 comprehensive and lots of things to chew on later.

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

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

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

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

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

23 Thanks Jeff.

24 MR. GLEESON: Great. So, thank you for having me
25 today. It's good to be here not only because this is my

1 home town but, also, because as Martha mentioned -- thank
2 you. Hopefully, everybody can hear me all right.

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

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

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

14 So it's good to be here today to talk about sort
15 of the steps that we're going to take towards those 2020,
16 2030 goals.

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

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

25 So really quickly, just some why, what, and

1 specifics of what I'm here to talk about this morning,
2 which is PG&E's Zero Net Energy Pilot Program.

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

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

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

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

23 We're also looking at large and small technology
24 assessments. That's a particularly exciting one. Small
25 technology assessments aren't really that small, we just

1 call them that because the larger ones are a bit loftier
2 in scope.

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

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

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

25 And then the third bucket is education. So,

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

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

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

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

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

24 Demonstration showcases then would be the
25 buildings that are on smaller scale, so an individual

1 commercial building, or an individual residential
2 building.

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

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

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

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

1 community-scale, transportation perspective on a site
2 that maybe could use some help. So, we'll have two
3 design competitions and those should be really great
4 events and, hopefully, we're going to see some really
5 great entries in those.

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

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

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

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

25 So, that's a really quick overview and I know

1 we're a little behind, so I'll stop there. And I'm going
2 to talk about some data for the Residential Program, but
3 I'll be back later this afternoon, happy to talk more.
4 It's a small pilot, but it's an exciting pilot. So,
5 looking forward to talking with you folks later, thank
6 you.

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

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

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

23 During Steve's 30 years at Edison he's held the
24 positions of Manager of Regulatory Planning, Manager of
25 Technical Support, Manager of Technology Assessment and

1 Application, and Supervisor of Load Management Programs.

2 Steve.

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

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

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

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

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

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

1 "battery" for some reason. But those homes will have
2 site-positioned batteries in them.

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

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

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

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

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

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

24 That is already changing and it will be changing
25 a lot in the next ten years, and that's the time frame

1 for zero net energy that we're talking about; high
2 concentrations of photovoltaics, inverters, that sort of
3 thing, electric vehicles.

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

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

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

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

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

25 And then the third project that I've listed here

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

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

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

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

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

23 This is actually Southern California Edison
24 funding the education and training of folks to build
25 these homes. And once built, they would actually build a

1 full-scale home, moving that home to the community, maybe
2 having Habitat of Humanity or somebody take it and
3 actually place it and have a family move into it, and
4 then build another home.

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

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

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

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

1 plans. It's to build an energy technology center, really
2 focusing in on zero net energy, that's what it is.

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

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

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

25 I think where we're coming from is simple is

1 good, and straight forward. We kind of like the CPUC's
2 approach. It's conceptually very easy to understand.

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

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

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

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

23 Then the last thing I'd like to say is sort of a
24 look back to the seven projects that I outlined. As you
25 can imagine or as you heard, what the future's going to

1 hold in terms of our grid is a big deal for us. And I'll
2 leave you with just this thought, if you think about zero
3 net energy, or just an average home, ultimately zero net
4 energy, but an average home in our service territory
5 consumes between 6,000 and 6,500 kilowatt hours.

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

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

10 So, if you put that all together and start to
11 think about what's going to happen in the future in terms
12 of our energy grid, along with all the photovoltaics,
13 which is increment and generation, there's a lot, a lot
14 of interest in what's going to be happening in the next
15 10 to 20 years.

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

23 MS. BROOK: Thank you.

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

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

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

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

15 Cathy.

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

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

24 So without further ado, as Martha said, what I'm
25 going to be talking about is the 2013 standards, Title

1 24, primarily the building energy efficiency both --
2 well, I'll get into this shortly, what we're talking
3 about there.

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

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

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

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

24 Moving it into the incentive programs, as Jordana
25 mentioned earlier Savings By Design is the utilities'

1 commercial new construction program. There's also the
2 Solar Homes Initiative that the utilities are working on.

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

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

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

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

1 of energy for -- specifically for residential for a 30-
2 year building time frame.

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

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

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

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

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

1 2020.

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

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

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

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

1 And I'll go into a little bit more detail here.
2 Then we're also look at equipment and plug loads. And
3 Title 24 has addressed lighting in both commercial and
4 residential buildings in the form of mandatory
5 requirements, specifically for residential. There's also
6 the interest in looking at additional loads.

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

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

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

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

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

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

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

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

1 and duct pressure testing requirements.

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

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

9 There's infiltration and testing requirements.
10 This is changing to be consistent with the air change
11 testing and values that are more consistent with IECC
12 2012 requirements.

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

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

25 The DHW compact design is basically the idea that

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

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

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

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

25 Again, with equipment the current emphasis that

1 we're looking on are upgradable thermostats that address
2 demand response.

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

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

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

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

24 We also have been talking in various areas about
25 the house energy budget. The Energy Commission is

1 looking at having larger homes that would use more energy
2 or would want higher allotment of, let's say, growing
3 areas and so forth to trade off against PV and other
4 renewables.

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

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

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

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

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

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

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

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

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

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

25 MS. BROOK: Great.

1 MS. CHAPPELL: Thank you.

2 MS. BROOK: Great, thank you.

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

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

6 MS. BROOK: Oh, great.

7 MS. CHAPPELL: You can answer those questions.

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

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

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

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

1 MS. BROOK: Okay.

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

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

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

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

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

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

1 reduction in energy consumption.

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

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

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

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

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

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

25 MR. MC HUGH: And so what you'd want to look at

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

7 MS. BROOK: Uh-hum.

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

11 MS. BROOK: Right.

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

16 MS. BROOK: Procrastination.

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

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

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

22 MS. BROOK: Yeah.

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

1 markets which can succeed and show the way.

2 MS. BROOK: Uh-hum.

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

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

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

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

22 MS. BROOK: Good, thanks.

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

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

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

17 MS. BROOK: Uh-hum.

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

24 MS. BROOK: Okay, great. Mike?

25 MR. KEESEY: Mike Keeseey, I'm with the Sacramento

1 Municipal Utility District, I'm the Project Manager in
2 our R&D group. I've been working on zero energy building
3 since the year 2000.

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

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

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

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

25 Getting back to the definition issue, we would

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

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

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

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

21 Things I see that are desperately needed right
22 now on the research end, I'm desperate for some right now
23 on a project, are construction details. Architects and
24 designers claim they know what to do and then when you go
25 out and give them a performance spec they come back at

1 you and say, oh, I don't know how to do that, it can't be
2 done.

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

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

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

18 MS. BROOK: Uh-hum.

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

21 Along those lines, also, the new construction
22 programs need to be -- they need to be changed. Our
23 residential new construction program I think is the only
24 utility program in the country that actual mandates PV as
25 part of the deal. I mean you don't get a construction

1 incentive for high efficiency without PV. And our
2 current program is at 20 percent above Title 24 and
3 requires PV and we're looking at Gen 2, which is going up
4 to 40 percent above Title 24.

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

7 MR. KEESEY: We don't.

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

9 MR. KEESEY: Well, on each building.

10 MS. BROOK: Okay.

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

13 MS. BROOK: Uh-hum.

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

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

1 reason it's got the designer's attention. I won't go
2 into my rant about that.

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

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

7 MR. KEESEY: Thanks.

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

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

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

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

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

1 MS. BROOK: Are you saying that the definition is
2 electricity only?

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

6 MS. BROOK: Right.

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

9 MS. BROOK: Right, right.

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

12 MS. BROOK: Sure.

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

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

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

19 MS. BROOK: Right.

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

22 MS. BROOK: Okay.

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

1 MS. BROOK: Okay.

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

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

10 MS. BROOK: Okay.

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

16 MS. BROOK: Okay, great.

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

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

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

25 I have a question both for Jon and for Steve.

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

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

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

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

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

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

24 And I think, you know, one of the things to think
25 about is what is -- you know, you saw earlier that graph,

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

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

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

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

20 And I actually think this actually relates back
21 to a larger issue. So, the builder of a new home is
22 competing against all the existing buildings and I'm
23 talking -- I'm talking right now about homes. But, you
24 know, half of the homes in the State were built prior to
25 the efficiency standards, the building standards. So,

1 we've got a bunch of old buildings without -- you know,
2 that are actually quite inefficient. And yet, when the
3 buyer is comparing a house versus a new house, they don't
4 necessarily have any information about the consumption of
5 that old house versus the new house.

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

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

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

1 first cost increment is but, you know, the bigger picture
2 is that even if I say it's zero energy consumption, well,
3 what does that mean compared to the building down the
4 street, it looks relatively new?

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

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

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

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

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

1 But I think that the idea is to have a
2 comprehensive program to do both. And how successful we
3 will be to -- you know, depends on, I guess, how much
4 groaning occurs.

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

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

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

13 Yes, come on up.

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

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

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

1 which are the most inefficient things for every one of
2 our utilities are in effect.

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

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

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

17 MS. BROOK: Uh-hum.

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

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

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

15 MS. BROOK: Great, thanks.

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

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

22 I worked with Dave on the '92 standards here at
23 the Commission and, you know, as Jon said every single
24 iteration of the standards the building industry says,
25 wait a minute, you're making homes too expensive, people

1 aren't going to be able to afford them.

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

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

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

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

1 ought to be disconnected.

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

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

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

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

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

1 interaction with the ambient air and its interaction with
2 the heat gain capability of fenestration, et cetera.

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

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

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

1 somehow have a venue or a group in order to -- at least
2 the early ZNE Projects -- to have that ability to discuss
3 and get these regulatory values out of the way because
4 they invariably conflict with other aspirations and goals
5 of the State agencies.

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

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

1 going to develop under the umbrella of the Clean Energy
2 Future activity, that is also part of the IEPR Docket.

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

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

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

1 would be a way. And I would kind of lean towards the
2 segment sort of approach, first. But that's just my
3 opinion.

4 MS. BROOK: Okay.

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

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

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

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

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

14 MS. BROOK: Uh huh. George.

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

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

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

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

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

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

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

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

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

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

1 that option vs. going back now aggressively. And so my
2 quip is you make the best practices the customer's best
3 choice because, right now, we make it the continued low
4 hanging fruit choice, and it's our worst enemy to get to
5 net zero in nine years.

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

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

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

14 MR. SPLITT: Okay. So I just had a couple of
15 questions or comments, basically details, essentially
16 residential comments because that's what we're mainly
17 talking about. And one thing I want to be sure to get to
18 higher energy efficiency performance, one thing I have a
19 problem with now that should be addressed is being able
20 to get credit for newer technologies, new mechanical,
21 water heating systems, efficient ventilation systems with
22 real efficient motors. There's really no way of getting
23 credit for that now, so there's no incentive for people
24 to put them in their building. So I think we have to
25 make sure that the compliance software enables us to take

1 credit for not just what's available at the instant you
2 release the software, but have it enabled so that it's
3 easy to put new things in there.

4 MS. BROOK: Okay, yeah.

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

15 MS. BROOK: Okay.

16 MR. SPLITT: Then, the last thing, and I
17 mentioned this before, is also going on some of the other
18 comments of why wait, is I think we should make mandatory
19 the QII duct blasting and blower door requirements
20 because these are basically just ways of getting people
21 to do what they're actually already supposed to be doing,
22 which is doing things correctly, and I can't see how the
23 Commission can allow people to still not do them
24 correctly. And then, have other programs where people
25 can come in and retrofit these buildings that were just

1 built to fix the problems that should never have been in
2 there in the first place. So, that's it.

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

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

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

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

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

25 MR. PENNINGTON: Good afternoon. My name is Bill

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

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

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

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

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

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

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

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

24 The PUC has done a huge and marvelous job of
25 developing a long term energy efficiency strategic plan

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

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

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

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

10 So this is just a timeline, a rough timeline for
11 what we see happening under AB 758 in the first couple of
12 years here of feet on the road, feet on the ground.

13 In 2011-'12, we've got the ARRA pilots, we've got the big
14 effort with Energy Upgrade California, we are in the
15 process of adopting regulations responding to AB 1103 to
16 have disclosure of energy use for commercial buildings to
17 be made at point of sale, point of lease, point of
18 financing. Early on in this period, it's our expectation
19 that we're going to be focused on doing a building asset
20 rating system for commercial buildings and, so, that's
21 there.

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

1 their work.

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

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

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

25 MR. STRAIT: One moment, Cathy. Cathy, you

1 should be unmuted now. Can you hear us?

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

3 MR. STRAIT: Yes, we can.

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

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

7 MS. FOGEL: Okay, great.

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

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

1 here.

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

4 MS. FOGEL: Okay.

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

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

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

1 programs, and then finish up with what I see as some of
2 the challenges and opportunities given AB 758. Next
3 slide.

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

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

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

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

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

25 So the program cycle of 2010 through '12, it's a

1 \$3.1 billion portfolio and there's also \$750 million
2 approved separately for low income programs. And for the
3 three years, we have combined saving targets adopted for
4 the utilities of 7,000 gigawatt hours, 1,500 megawatts,
5 and 150 million metric therms. So that's about equal to
6 three major power plants deferred through our energy
7 efficiency programs over the next three years, or over
8 the three-year cycle. And the efficiency is treated as a
9 resource and, so, it's incorporated into procurement
10 plans, and just to note that Public Good Fund comprises
11 about 43 percent of this total \$3 billion budget, through
12 the Gas Public Purpose Program surcharges on your utility
13 bills, and also the Electric Public Goods charge. And an
14 additional nearly 60 percent is funded through utility
15 procurement dollars and we and the utilities pool all of
16 that into one funding source to go after this cost-
17 effective portfolio.

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

25 So the California Energy Efficiency Long Term

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

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

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

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

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

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

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

24 So far as savings on the residential side for
25 kilowatt hour savings, res programs are saving about 33

1 percent, with commercial saving about 30, and therms
2 savings are dominated by industrial programs at about
3 half of therms savings with commercial at about 20 and
4 residential programs coming in just above 10 percent of
5 the therms savings. And some of these figures are at the
6 end of this Powerpoint for reference, so you can access
7 it online later if you're interested. Next slide,
8 please.

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

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

1 led installation of appliances and heating systems and AC
2 systems, and light bulbs, etc., in multi-family
3 dwellings.

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

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

1 utilities.

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

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

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

1 outreach available for this and other programs.

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

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

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

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

25 MS. FOGEL: Okay, super. As you heard this

1 morning, Jordana is our Commercial Sector Analyst and
2 she's going to talk about the Commercial Programs here if
3 we can get her unmuted.

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

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

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

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

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

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

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

25 And then, in addition to that, as you can see,

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

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

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

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

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

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

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

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

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

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

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

1 and, as we think about how to direct the utilities to
2 undertake more market transformation activities, or how
3 those activities might be funded using ratepayer funds.
4 Next slide, please.

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

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

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

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

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

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

1 be actively leading the Non-Residential portion of the
2 technical support activities for AB 758. So, Eliot.

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

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

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

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

1 piece of that work, HERS improvements, affordable housing
2 initiatives, and looking to improve compliance
3 enforcement, which is what Nehemiah will be covering in
4 his portion of the presentation.

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

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

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

1 tasks include interviewing 15-20 stakeholders and we're
2 certainly open to suggestions on who would be the key
3 people that we should obtain input from. We have a lot
4 of expertise within the team, we can tap into a lot
5 within the Energy Commission, but we're looking to engage
6 with the market and really pull in what's needed and
7 separate out what's currently being offered, what is
8 currently planned to be offered, and Cathy and Jordana
9 gave a really great account there of the wide range of
10 services being offered through the CPUC and the
11 utilities. And we're looking to complement that with
12 this work here.

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

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

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

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

22 Rating and Disclosure Programs is a really
23 fundamental early part of the infrastructure and, again,
24 you know, in measuring ratings, you can also measure
25 improvements in ratings, so that will be a big part of

1 our assessment of the program as we go forward, how
2 people are taking up the ratings and disclosures, and how
3 effective those ratings and disclosures are in actually
4 promoting improved energy efficiency.

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

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

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

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

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

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

1 and to another degree it will be looking to take the lead
2 and really push things forward.

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

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

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

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

1 dispense with the niceties and start arguing just at the
2 outset, you know.

3 MR. STONE: Habit.

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

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

24 One of the slides that I don't have here in the
25 Residential section because it was -- Eliot covered it in

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

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

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

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

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

1 Plan.

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

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

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

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

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

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

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

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

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

25 There's some innovative ways of getting at

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

25 So we'll be looking at potential opportunities to

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

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

1 there, what we're going to do is we're going to work with
2 the programs that are out there, and get them to pilot
3 different innovative efforts within those programs to see
4 if we can find a way of increasing penetration and
5 increasing efficiency gains.

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

1 compliance improvement efforts, and they need to be
2 targeted to the specific barriers that are there.

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

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

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

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

24 In our IEPR Report recommendations, in the Draft
25 Report, we emphasize data driven policy. What design

1 support tools do you think we need to reduce barriers to
2 energy efficiency, demand, financing, and implementation?
3 So, would a panelist want to take that on?

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

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

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

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

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

25 MR. PENNINGTON: Okay, thank you. Cathy, would

1 you like to respond?

2 MS. FOGEL: Can you hear me?

3 MR. PENNINGTON: Yes,

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

1 the contractor base in the residential sector would be
2 helpful in our efforts.

3 MR. PENNINGTON: Okay, thank you.

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

1 ask questions and get an answer based on data from six or
2 seven different research reports because their data is
3 all in the same format.

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

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

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

7 MR. PENNINGTON: Thank you.

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

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

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

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

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

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

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

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

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

18 MR. STRAIT: We can hear you.

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

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

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

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

1 needs to be a little bit more realistic about how scaling
2 up might occur.

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

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

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

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

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

1 that can help the offering of services effectively to
2 those markets.

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

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

1 want to get answered.

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

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

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

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

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

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

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

11 MR. PENNINGTON: Thanks, George.

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

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

14 MR. PENNINGTON: Thank you. Pat.

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

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

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

1 MR. PENNINGTON: Okay.

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

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

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

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

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

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

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

21 MR. PENNINGTON: Okay, thank you.

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

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

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

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

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

25 MS. FOGEL: Yes, sorry, I had you on mute. I

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

1 all this, and we need to take advantage not only of the
2 peer pressure Nehemiah mentioned, but some other behavior
3 change, social marketing techniques can really focus on
4 neighborhoods and community outreach, and generating
5 earned media, which I think will be essential going
6 forward.

7 MR. PENNINGTON: Thank you. Pat.

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

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

15 MR. EILERT: Yes, I do care.

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

18 MR. NESBITT: George Nesbitt. I think it's going
19 to take a lot of consistent and reinforced marketing.
20 It's got to be down at the Building Department, it's got
21 to be at the Material Suppliers, the design houses, in
22 the architect's offices, and the contractor's, it needs
23 to be on the radio, on the TV, on the Web, wherever,
24 whether it's social media, you know, all forms, it just
25 needs to be a message that is constantly out there and

1 not something that comes and goes, which has often been a
2 problem. Back in the old days, I was in the RCP Program
3 when it died and there was marketing on the radio that
4 told you that you needed to call the Smarter Energy line
5 and then they'd get the referral to the contractors and
6 all that, and so programs come and go, marketing
7 campaigns come and go, and the problem is we keep
8 starting, stopping, starting and stopping. So we need to
9 maintain some consistency and it needs to be reinforced
10 on all sorts of levels.

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

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

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

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

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

20 MR. PENNINGTON: Okay, great.

21 MR. STRAIT: Jim, you are live.

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

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

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

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

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

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

1 on with this utility, I keep getting these usage things,"
2 and he says, "I put in new windows and I'm still getting
3 them." So we got the neighborhood together and it seems
4 that this is a program that SMUD engages in, and I will
5 name them, and instead of getting us now to upgrade, if
6 we see a SMUD agent in the neighborhood, he's in danger.
7 So you've got to be very careful about what you're
8 putting out there and you better know it improves because
9 a lot of it does not improve what you're trying to do.
10 And that's my comment.

11 MR. PENNINGTON: Thank you. So we're reaching
12 the witching hour on this panel, so one more commenter.

13 MS. GAVRIC: Funny you should mention witch. My
14 name is Jelisaveta Gavric, and I'm with the California
15 Association of Realtors. And it may be a little bit
16 confusing to some of you if you've heard a different name
17 from me before, this is my ethnic name, you may know me
18 as Elizabeth Gavric. I just came here today to not
19 necessarily comment on any of the questions, but I did
20 want to give a little bit of a historic perspective to
21 the other people in the room here who have not been
22 involved with the Legislative portion of the fight to get
23 or to pass AB 758 Skinner. The bill actually started off
24 in a previous legislative session, it was AB 2678 Nuñez,
25 and that bill the realtors were vehemently opposed to

1 because a friend in the audience just said realtors tend
2 to be opposed to time of sale mandates, and we were. And
3 AB 2678 had a specific mandate for audits and
4 specifically retrofits at time of sale. The Legislature
5 did consider that bill and they decided that they would
6 not advance or pass that bill, that was something the
7 Legislature decided that they didn't feel was good
8 policy, and that was to advance a piece of legislation
9 which demanded retrofits at time of sale.

10 There was also similarly a bill recently passed
11 in the last session that was Senate Bill 407. That bill
12 initially started off by Senator Padilla as being a
13 mandatory time of sale water fixture retrofit bill, and
14 through a tremendous amount of debate and discussion,
15 again, within the California State Legislature, it was
16 determined that a time of sale program was not a good
17 approach to achieving efficiencies in California's
18 housing stock. And so that bill was eventually amended
19 to do just a date certain that all homes have to be
20 compliant with these fixtures, by several different
21 dates, 2014 for retrofits, 2017 for single-family
22 housing, and 2019 for commercial properties and multi-
23 family housing.

24 So going back to AB 2678, which is where the
25 genesis of AB 758, Assembly Member Skinner had the

1 wherewithal to understand all of the arguments,
2 complaints, and considerations that were given for AB
3 2678, and so when she reintroduced the concept, she
4 actually took out the point of sale mandate that was in
5 2678. She specifically stated in her bill that the
6 program, AB 758, would include a broad range of
7 implementation approaches, and she also specified in her
8 bill that assessments, ratings, or improvements will not
9 unreasonably or unnecessarily affect the home purchasing
10 process. And so I'm just here today to echo the actual
11 language that statutorily is in place that we are using
12 as the basis for the promulgation of these regulations.
13 I want to remind folks that, as we go forward in this
14 process, that the realtors are very supportive of
15 increasing home energy efficiency, and for Nehemiah and
16 Eliot, I hope that we are one of your 11 to 14
17 stakeholder interviews that you get, or at least -- no,
18 not getting that? Okay, well, then, I won't give you my
19 card then. But we do strongly believe that it will take
20 a lot of innovation to get that deep market penetration
21 that we need because you cannot take a market where it is
22 right now with less than two percent of houses turning
23 over, and half of those are banked owned. You cannot get
24 those homes energy efficient and achieve that 40 percent
25 goal that you would like to see by 2020, it simply cannot

1 happen. So we're here to help, we're here to advise and
2 see what we can do to at least provide insight into the
3 real estate transaction, we know that real estate will be
4 one star in the constellation that will make up this
5 program, we know it's not going to be the sun, it won't
6 be the center of the universe for us, it can't be, it's
7 just not functional, it's not the way this program is
8 going to be successful. And that's all I'm here to say.
9 Thank you.

10 MR. PENNINGTON: Thank you much. So I'm going to
11 call a close with that, thank you very much, everyone,
12 for your comments. Thank you very much for the panelists
13 to be here and make their presentations, so I appreciate
14 it. Thank you, Cathy. We're going to take a short
15 break. Is that right?

16 MR. STRAIGHT: Yes, we're going to have a five-
17 minute break. During this time, there's a small bit of
18 technical assistance I need to provide one of our call-in
19 users.

20 (Recess at 2:46 p.m.)

21 (Reconvene at 2:55 p.m.)

22 MR. LEAON: Okay, folks. If we could all find
23 our seats, let's go ahead and get started with our next
24 panel discussion. For the record, my name is Michael
25 Leaon, I'm the Manager of the Appliances and Process

1 Energy Office. And this afternoon we'll have a panel on
2 reducing plug loads in buildings, so we're switching
3 gears a little bit, but talking about a very important
4 component of meeting building energy efficiency goals. I
5 think we have another excellent panel for you this
6 afternoon. Our panelists will include a talk from Dr.
7 G.P. Li with UC Irvine, also Randall Higa with Southern
8 California Edison, he'll be telling you about standards.
9 We'll also -- a little change on the panel make-up for
10 this session -- Michael Siminovitch will not be able to
11 make it and the co-director of the California Lighting
12 Technology Center, Kosta Papamichael, will be speaking
13 instead, and we also have a remote presentation from Dr.
14 Carrie Armel with Stanford, and also we'll hear from
15 Jonathan Williams with Intel Corporation, and they'll
16 both be addressing the topic of alternatives to standards
17 for meeting building energy efficiency goals. So with
18 that, I'd like to go ahead and kick off our panel
19 presentations with Dr. Li, and Dr. Li, if you'd like to
20 come up to the podium?

21 DR. LI: Thank you, Mike.

22 MR. STRAIT: Uh, one moment, we have to locate
23 the presentation, just one second. Okay, we're going to
24 do a little change in the order of the presentation.
25 Randall, if you don't mind starting off, if that's okay,

1 we're having difficulty locating Dr. Li's presentation
2 and I'm going to go locate that and bring that back. And
3 in the interim, we'll hear from Randall.

4 MR. HIGA: Thanks, Mike. And welcome, everybody,
5 to the final panel presentation today. I'm going to be
6 talking about the Utilities Codes and Standards work
7 specific to plug loads and appliances, and in our world
8 sort of the plug loads and appliances are mostly
9 synonymous, but you know, the appliance standards also
10 relate to things like water heaters and small air-
11 conditioners, so it's a little bit expanded from just the
12 traditional plug loads. So I'm going to try to sort of
13 take off from where Cathy Chappell [phon.] left off this
14 morning, she was talking more about the Building
15 Standards related specifically to the buildings,
16 themselves; I'm going to be talking a little bit about
17 Building Standards, but mostly in the context of plug
18 loads, as well as, of course, appliance regulations also.

19 First, I wanted to give an overview of what the
20 utility programs involve and consist of, so the Codes and
21 Standards Program is a statewide program, meaning that
22 Southern California Edison, PG&E, SoCal Gas, and San
23 Diego Gas & Electric work together on the same program to
24 work with and support the California Energy Commission in
25 developing -- and I'll just say "more stringent" --

1 energy standards, both buildings and appliances. We do
2 deal with the Federal Regulations, and I'll talk about
3 that in a minute also.

4 So the four programs for the Codes and Standards
5 Program is we do the Building Code Advocacy, most of that
6 is Title 24, Part 6, we do get involved with Title 24,
7 Part 11, which is CalGreen, and we also coordinate with
8 the other model energy codes such as ASHRAE 90.1, IECC,
9 and some of the Green Building Codes as IGCC and the
10 IECC. Sorry for the alphabet soup there. The second set
11 of programs is pretty much the same thing, except we're
12 focused on appliance regulations, in this case, Title 20,
13 and also the Federal standards. We also have two other
14 sub-programs new for this Code cycle, and that is a
15 compliance enhancement, we call it holistic, meaning that
16 we're trying to increase the compliance rates across the
17 board, rather than any sort of focused activities. We do
18 some focused compliance enhancement activities under the
19 first two sub-programs, which we call extension of
20 advocacy, where we're trying to make sure that the
21 verified energy savings of new Codes that we are involved
22 with have the highest level of compliance. And then the
23 Best Practices pilot is a program that we're working
24 with, where we're working with roughly we're targeting
25 about 12 local governments statewide to sort of take a

1 deed dive into the processes for plan checking,
2 inspection, etc., and we're trying to come up with better
3 ways to get through that process of plan check and
4 inspection, and we're going to put together a report of
5 all the best practices and try to communicate that out to
6 the other cities in the state.

7 And the last thing is REACH Codes, and this is
8 where we work with local governments who are interested
9 in adopting ordinances that go beyond the base Title 24
10 Code, so because it is a highly political process, we
11 don't try to get involved with their politics and it's
12 more of a reactionary role in the sense that, if they are
13 interested in doing a REACH Code, we'll support them with
14 a cost-effectiveness analyses, ordinance writing, etc.
15 etc. Most of them, these days, are tied together with
16 Green Building Codes, so it's just an element of it,
17 including CalGreen which have Tier 1 and Tier 2 levels of
18 compliance, that is Tier 1 being 15 percent beyond Code,
19 which is where most of the REACH Codes are at these days,
20 and then Tier 2 at 30 percent beyond Code.

21 So, getting back to plug loads. These are some
22 of the three main areas in which we deal with plug loads.
23 So, as I mentioned before, as far as the first sub-
24 program, we're dealing with building standards and
25 building regulations. And we focus our attention on

1 Title 24, Part 6, but as I said, also Part 11, which is
2 CalGreen, as well as the model Energy Codes. And where
3 the -- one distinction maybe is how, one way to look at
4 it, is that we're not regulating the efficiency of plug
5 loads, but we're trying to set standards of regulations
6 for how the plug loads are used, and let me give you an
7 example. We're looking at requirements for office
8 buildings where task lighting would be on separate
9 receptacles that can be put onto time clocks, or
10 connected to the building energy management systems, so
11 they can be swept off at night, so we're not trying to
12 change the efficiency of those task lights, or they could
13 be printers, or monitors, or whatever, but we're putting
14 into the Building Code the ability, not necessarily
15 forcing people to do it because you can't tell people how
16 to control the buildings, but at least giving them the
17 capabilities to turn off those plug loads. We're doing
18 something similar for residential, and those are just a
19 couple of examples of how the plug loads actually could
20 be a part of the Building Code.

21 Of course, a key thing on plug loads is the Title
22 20 Regulations. Again, it's something what the utilities
23 do is develop in the same way as the Building Energy
24 Standards is, develop code change proposals to support
25 the CEC in developing new versions of other regulations

1 and Building Standards. So, thus far, the IOUs have been
2 -- the utilities have been involved in a number of
3 measures, those are just a couple of examples of them.
4 The most recent one completed, I guess, would be
5 televisions. I looked at sort of from our latest impact
6 evaluation studies, some of the highest energy savings
7 measures and those, I think, are the top four, so Pulse
8 Start, HID Lights, walk-in freezers and coolers, and pool
9 pumps. And currently we're working with the CEC on the
10 battery charger rulemaking, which we hope is going to get
11 wrapped up soon, and then we also have some future
12 proposals that we're thinking about and I'll get into
13 those in the next slide, what we're calling Phase 3 and
14 Phase 4. And lastly, we have been working with the
15 Federal Department of Energy in their appliance
16 regulation rulemakings, all of which are included as part
17 of Title 20, and of course the key issue with the Federal
18 Standards is, well, it's good in that you have a
19 nationwide standard for efficiency for appliances and
20 plug loads, it preempts the state from adopting more
21 stringent Codes, more stringent efficiency levels, for
22 those appliances. And these days, although California
23 may have started the regulation of appliances back in the
24 '70s, now the Federal Government has taken over the
25 regulation of a large number of those efficiency

1 regulations. Their process is a lot slower and, so, the
2 pace at which the regulations at the Federal level can
3 proceed is not generally as quick as what we could do
4 here in California.

5 The bottom line is, as you've heard in the
6 previous presentations, plug loads are significant energy
7 use in buildings, both residential and non-residential,
8 and to the extent that we cannot surpass efficiency
9 levels of those Federal requirements, it does pose a
10 significant barrier to reaching the Zero Net Energy
11 goals, so it's something that we're trying to work
12 around, work with, and work with the DOE to get the
13 highest efficiency levels that we can.

14 Getting back to the upcoming Title 20 topics,
15 this is just an example of the items that we're
16 considering proposing, and I won't read through all of
17 this list, you could take a look at these. We see the
18 Phase 3 starting, having the scoping workshop later this
19 year, and then Phase 4 following that at some time. This
20 is just a little chart to give you some idea of what kind
21 of energy savings, the orders of magnitude of energy
22 savings, the battery chargers, ones that we're involved
23 with now. As you can see, it's roughly 2000 gigawatt
24 hours per year. Again, that's after turnover which we've
25 got defined at the bottom there, first year savings times

1 estimated useful life.

2 So we're talking about pretty big energy savings.

3 Again, I think you saw from the previous presentations,
4 you know, how big these markets are and how much we're
5 impacting the marketplace with these appliance
6 regulations. Again, it affects both new buildings,
7 existing buildings, everything, because everything that
8 is sold will have to meet these regulations.

9 So just in summary, this is what we see as
10 potential benefits of the future Title 20 topics, and
11 those of you who have been in the workshops before will
12 recognize these, they are the same slides, but I just
13 wanted to sort of reiterate that this is a big deal,
14 there's a lot of energy savings here, there's a lot of
15 potential, but this doesn't necessarily get us through
16 this barrier of preemption, and it doesn't by itself get
17 us to ZNE, so, you know, more work is still required, but
18 at least I think we're off to a good start. So, thank
19 you.

20 MR. LEAON: Thank you, Randall. Okay, so we're
21 going to proceed with Dr. Li's presentation. Peter, if
22 you could get that teed up and, Dr. Li, let me give you a
23 proper introduction here. Dr. Li is a Professor at the
24 University of California Irvine with appointments in
25 three departments, Electrical Engineering, Computer

1 Science, and Chemical Engineering and Materials Science,
2 and Biomedical Engineering. At UCI, he also serves as
3 Division Director of the California Institute for
4 Telecommunications and Information Technology, and
5 Director of the Integrated Nano Systems Research facility
6 in the Henry Sumueli School of Engineering. He receives
7 his Bachelor's Degree in Electrical Engineering from
8 National Cheng Kung University in Taiwan, and his
9 Master's and Doctorate Degrees also in Electrical
10 Engineering from UCLA. Dr. Li.

11 DR. LI: Thank you so much, Mike. Before I
12 start, I would like to take this opportunity to thank the
13 Organization Committee for inviting me to come to this
14 meeting and I would also like to thank you, the audience,
15 to allow me to share a research idea with you. And
16 lastly, I would like to take this opportunity to thank
17 CEC PIER Program for their support to our Centers.

18 So, currently we are working on the California
19 Plug Load Research related topic and just started the
20 Center in UCI. So the topic I'm going to present to you
21 today is The Big Picture: Importance of Plug Loads in
22 Meeting Zero Net Energy -- Existing Energy Efficiency
23 Goals.

24 So I am showing here in the last four years, we
25 have witnessed the tremendous growth of plug load devices

1 at home. Starting in '70, it was about two devices; in
2 this generation, we are talking about more than 40
3 consumer electronics devices at home. And this
4 penetrating of the consumer electronic devices,
5 penetrating into the home, can be attributed to the
6 success of semiconductor, microelectronic technology
7 following the Moore's Law in that industry, we have
8 witnessed every two years they have doubled the density
9 of the memory, and doubled the processing power. As a
10 result of that success, we have seen the affordable
11 processing power, information processing, information
12 communication, and control, at the fingertip of the uses.
13 And this is really good for the economic growth, but it
14 also puts tremendous stress on the energy consumption in
15 our communities. So, more than that is, this kind of a
16 consumer electronic plug load is not typical Building
17 Standard problems. The reason for that is, these devices
18 have wide range of devices, as I illustrated earlier to
19 you, more than 40 to 100 devices. And what are the uses
20 of those devices? They are used ranging from two-years-
21 old all the way to 100-years-old, so you don't have a
22 target user group to come up with a standard, or come up
23 with an incentive for the use to adopt the most energy
24 efficient solutions.

25 Also, the retailers, they have a wide range to

1 sell the product to the consumers, and most importantly,
2 because this is following the semiconductor,
3 microelectronic industries, so it has a very fast
4 development cycle, so almost every two years you will see
5 a new generation of consumer electronic plug load
6 devices.

7 And the example of the iPhone and the iPad, we
8 have seen is almost every six months we have a new
9 generation coming up, so this is the reality we're
10 dealing with in the plug load environments. So, as a
11 result of that, depending on what report you are reading,
12 we see in today's, the consumer plug load devices
13 contributed to about 10-15 percent of over energy usage
14 at home and, in the near future, according to the
15 predictions, it will grow to 30 percent of over-energy
16 usage. So this becomes a major issue we have to deal
17 with.

18 To further validate these statements, here shows
19 a report, the forecast report from Department of Energy,
20 using the 2006 study reference point about the energy
21 usage growth in the residential area due to the plug
22 load. So what you can notice here is, in most of the
23 sector of the so-called ether-wire goods, or the
24 lightings, or the water heating, and so on, in the next
25 20 years we see sort of a steady growth, it's a relative

1 fact. On the other hand, when we look at the plug load
2 devices, continued growth. So, if we use the number of
3 the household growth rate in the United States in the
4 next 20 years, and look at it compared to the plug load
5 devices, it's substantially higher than that. And the
6 reason for that is the plug load devices is not used by
7 only one person, so now you can imagine, for one cell
8 phone, in the past, we think about one phone per
9 household, now we are talking about one or two phones per
10 person, and the number makes a difference. And think
11 about worldwide, when we have more than one billion cell
12 phones in use, and the number makes a difference even
13 though individual plug load devices use less energy, and
14 they are more energy efficient. So that is the issue at
15 hand we have to deal with.

16 So, similarly, from that same report, in the
17 commercial, the residential and non-residential area, we
18 also see the growth of the plug load energy usage as
19 compared to the growth of the floor space. Again, they
20 are attributed to the plug load related to the office
21 equipment, and also a variety of like the ATM, telecom
22 gadgets, and so on. So this is the growth area. So far,
23 we don't have a very good way to control the use of
24 energy due to this tremendous growth of the use of the
25 plug load devices in both residential and non-residential

1 areas. So, these plug load devices further complicate
2 the issue of over-energy consumption. The reason for
3 that is, so far, there are only a very limited number of
4 plug load devices that have been studied. For example,
5 external power supply, the battery chargers, and the TV
6 and so on, they are only a few that we have done
7 tremendous study, and more work is needed to be done.
8 But more than that is, so far, we have not done more job
9 about the interaction of many plug load devices; for
10 example, at the home, entertainment system, you can
11 imagine they are more than 10 devices that plug in, and
12 to give you one example, when I watch TV, sometimes I
13 need to turn on the VCR and either turn on the DVD, I
14 need to turn on the stereo, and so on, and by the time
15 I'm done with watching TV, sometimes I forget to turn off
16 other plug load devices, I just turn off the TV and walk
17 away. So, the interaction of other plug load devices
18 become an issue to us in terms of over-energy savings.
19 So, in order to come up with a solution, we have to think
20 about it's not only in the visual plug load device
21 efficiency, but also the interaction among them, we have
22 to come up with a solution like that.

23 So as a result of this progressive use of
24 microelectronic devices in the consumer electronics, we
25 also accelerate the use of the devices in different

1 sectors of business. And for example, now days, you can
2 easily see those plug load devices used in the buildings
3 as a way to do Demand, Response and Demand solutions, and
4 also using the vehicles and using the wire good area as
5 intelligent appliances, and so on.

6 But one unique feature about the plug load
7 devices is we are using the semiconductor microelectronic
8 technology, and they are all powered by the DC source,
9 and they need to have a timer embedded. So, by the time
10 you turn off your appliances, the timer needs to be on,
11 as a result you have continuous AC to DC converging to
12 power up your timers. As a result of that, you do see
13 additional so-called Vampire load which you don't see
14 that in the regular traditional appliances. When you
15 power up the appliances, actually, the device is still on
16 and, in the steep mode [phon.], in the Vampire load,
17 energy consumption ranging from .5 watt to 1 watts. But
18 think about it now a days, in U.S. we have more than four
19 billion plug load devices, so what is the energy
20 consumption? That's a four billion watt hours and 7/24,
21 and how do we deal with that? So the real issue is, a
22 simple sum, it's more than the past of the audio plug
23 load devices. And this issue is further complicated by
24 the emerging demand of plug load devices at home. As you
25 know, our nation is moving towards managed care in order

1 to provide higher quality of care, at the same time
2 reducing the cost, so that the ration in the managed care
3 is, for example, to have a medical home device, medical
4 home solution, as well as tele-medicine, so that the
5 doctor can get into the iPhone or Smart Phone and talk to
6 the patient at home, and the patient also can talk to
7 some of the technicians and to discuss the testing
8 results and so on. So all of the devices used here are
9 plug load devices. Even now, you will see more use of
10 the devices in this medical home industry, for example,
11 now there is for the diabetes patients, they deal with
12 the special insulin pump, it senses the glucose level and
13 injects insulin. And you will continue to consume the
14 energy, but in the future what we see is these medical
15 devices number will grow, as well. And this is very
16 similar to the automobile industry, and in that industry
17 we have seen more than about hundred sensors embedded
18 inside the car as a way to improve, enrich driver's
19 experience. And we see the same thing what happened here
20 as a result of using those sensors, that it will enrich
21 patients' or users' experience and actually manage their
22 wellness and care. And all the devices become sort of
23 plug load devices at home and it will consume the energy,
24 as well. So this is a really emerging demand of plug
25 load devices.

CALIFORNIA REPORTING, LLC

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

1 So far, in medical sectors, we have not done any
2 regulation of medical devices, they are regulated by FDA
3 to deal with safety of the devices, as well as efficacy
4 of the device. So we have not done any Standard Code for
5 the medical devices. And it consumes about four percent
6 of over-energy in our nation. So, there is a need to
7 look at those emerging markets and see how we come up
8 with solutions.

9 So, at this point, I would like to point out how
10 to take a holistic approach so that we can come up with a
11 solution to what is a Zero Net Energy Efficiency
12 Buildings. So one thing I like to bring to your
13 attention, most plug load devices are developed based on
14 the consumer - based on the semi-conductor
15 microelectronic devices. So they are powered up by the
16 DC source. So, in order to have the timer on, we always
17 need to have the device plugged in, to have the AC to DC
18 consumption. So the one question we could ask ourselves,
19 in the future, would a building battery save energy as
20 compared to the full-time AC-DC conversions? So far, do
21 we have that solution? That's one simple question. I
22 don't have the answer yet, and that is some issue we need
23 to look at. And the second thing is, when we talk about
24 on-site renewable energy generation such as the solar
25 panels, and the fuel cells, or the windmill, and so on,

1 they all generate DC power. But what we did is to
2 convert the DC to AC, it has 10 percent efficiencies. By
3 the time we use the electricity at home for the plug-load
4 devices, they are all powered up by DC, even the TV,
5 right? So we have to go through the process of
6 converting the AC to DC, again, that is 10 percent
7 efficiency. So overall, by going through the process, DC
8 to AC, AC to DC, we lost 20 percent of efficiency. And
9 have we done anything about that? And that is the
10 question we're posing here. So should we think about in
11 the future, should we have a DC distribution system in
12 the buildings? Right? So we can isolate the DC system
13 from the AC system, and because this is a generation of
14 distributed generation, so that is the question we are
15 posing here as a way for discussions.

16 Also, as I mentioned earlier about emerging
17 market demand, or plug load, in health care, in home
18 entertainment, social media, social network, and the
19 video conferences, they are all devices we see have a
20 tremendous use to help us manage our care, or manage our
21 wellness, or to have a way to reduce travel to visit
22 doctor's office, or to have sort of a telecommute instead
23 of coming to Sacramento for the conference, I can stay in
24 my office to have video conferencing with all of you, and
25 it will save energy in a different form. So we need to

1 think about the new Standards for the plug load
2 efficiency in terms of over-energy saving, not just
3 electricity efficiency itself, but overall energy saving
4 because you can reduce energy consumption in different
5 forms. So I think that is another topic that always
6 comes up in my mind, is how do we deal with that. So
7 far, we don't see a way to handle that.

8 And the other area is the Demand Response for the
9 plug load in buildings. As I mentioned to you earlier,
10 there are many opportunities here to introduce the Demand
11 Response solution to the buildings and to the plug load
12 devices as a way, say, for example, depending on the
13 occupancy inside a building, you can turn on and off air-
14 conditioners, you can turn on or off the lights, and so
15 on, as a way to further save energy. And that can be
16 sort of an incentive program to have a better rating for
17 the residential home, or non-residential buildings,
18 instead of having Standards. So those are the tradeoffs,
19 I really don't have the answer, and it is worthwhile
20 discussing. And also, when we look at all the sort of
21 very short development cycle for the consumer electronics
22 and we need to have production of ever improved energy
23 efficient solutions. We have to look at different
24 incentive approaches. Currently, when we think about the
25 incentive program for the consumer electronics, all we

1 think about is the consumers, but I know the CEC and also
2 two of the companies are looking at different incentive
3 programs to provide incentives to retailers. For
4 example, if you provide \$20.00 rebate for buying a high
5 energy efficient flat screen TV for a consumer, that is a
6 very small percentage, but if you provide \$20.00 to a
7 retailer, their profit margin is, I don't know, \$50.00,
8 they do have incentive to sell more energy efficient
9 products, so that is a different game change. And that's
10 worthwhile discussing here, as well. And lastly, one
11 thing we do know is consumer electronic cycle, much
12 faster than the center can do, so this is - a lot of
13 opportunity for us to think about, most of the consumer
14 electronic use is the younger generations, they are the
15 agents of change, they are sort of the early adopter of
16 any new gadgets, so if there is a way to use the Social
17 Network, use a different platform, media platform, to
18 reach out to their audience, maybe there is a way to do
19 game change instead of dealing with traditional Codes and
20 Standards approach. So I think that is the opportunity
21 area for us to reach our goal, as well.

22 So at the end, I pose a question. Dealing with
23 energy is at the start of forever, right, so we talk
24 about 2020 for the home and 2030 for the buildings, non-
25 residential buildings, we know to reach our goal is

1 challenging enough, but can this Zero Net Energy last as
2 the family grows and prospers? An example, we know back
3 to '60s, on the average in the United States, one car per
4 household; today it is 2.3 cars per household. That is
5 the nature of the growth, that is the economy we have
6 here, and we know that is going to continue growth as we
7 prosper. So how do we come out with zero net energy and
8 last forever? It's not just for one year, or 2020, or
9 2030. And how can we handle growth demand for plug load
10 in the emerging markets? And this is also, as I
11 mentioned earlier, because more and more devices will
12 come and I do believe every year we will see maybe 10
13 more new devices, every time when you visit consumer
14 electronic tradeshow in Las Vegas, you will see the
15 number of attendees, it is double every year, and we see
16 that as the market we're dealing with. And how do we
17 really join forces with them and encourage them to
18 provide more energy efficient solutions to our sectors of
19 business? It would be one of the things we need to work
20 on, so also in today's discussion, in the morning and in
21 the afternoon, first sections, always ask a question, is
22 zero net energy efficiency a requirement just for the
23 building or for all of us? I think that is a question we
24 need to answer. It's not just built and we are ready to
25 go, it's when we live in there, and how we use the plug

1 load inside the building that makes a tremendous
2 difference in the outcome of energy savings.

3 So, to deal with all the issues at UCI, we come
4 up with the so-called California Plug Load Research
5 Centers, and we are taking a holistic approach, including
6 energy research for coming up with the solutions. And
7 also, we are working with the professors in Social
8 Science, as well as in Economics, to come up with market
9 behavior research to understand the implications of the
10 plug load on the adoption of the solution for energy
11 efficiencies. And also, we will work closely with the
12 CEC, CPUC, and utility companies and manufacturers and
13 retailers and common organizations and so on to organize
14 and coordinate efforts. I think that this is the only
15 way we can come up with consensus and to come up with a
16 solution. And lastly, we have to bring the awareness to
17 the public. Education is so important. We happen to be
18 education sectors, and we are very creative to come up
19 with the different media channels to reach out to our
20 youngsters and see how we can include them in the process
21 in achieving our zero net energy goal. So if you are
22 interested, please join us in California, Plug Load
23 Research Center, an attachment at the end of the slides.
24 Thank you.

25 MR. LEAON: Thank you very much, Dr. Li. Next on

1 the panel discussion we'll have a talk from "Kosta"
2 Papamichael. Kosta is a Professor and Co-Director of the
3 California Lighting Technology Center at the University
4 of California Davis. Kosta holds an Architectural
5 Engineering Degree from Aristotelian University in
6 Thessaloniki, Greece, a Masters in Architecture from Iowa
7 State University, with a major emphasis in Building
8 Science, and a minor in Energy Systems Engineering, and a
9 PhD in Architecture from the University of California at
10 Berkeley, with a major emphasis in Design Theories and
11 Methods and minors in Building Science and Computer
12 Science.

13 During the last 30 years, Kosta has been working
14 on the development of energy efficiency strategies and
15 technologies for buildings, focusing on lighting,
16 daylighting, and the integration of electric lighting and
17 fenestration controls. He participates in a wide range
18 of academic and professional activities related to
19 daylighting, electric lighting, energy, and environmental
20 impact. He is author and co-author of over 80
21 publications and holds four patents on lighting controls.

22 Kosta is also a member of several committees
23 addressing lighting and daylighting issues, and currently
24 serves as the Chair of the Illuminating Energy Society
25 Daylighting Committee. His work in photo sensor-based

1 lighting controls for daylight harvesting was recognized
2 by the Illuminating Engineering Society as a unique and
3 significant advancement to the Art and Science of
4 Lighting. So, with that, Dr. Papamichael.

5 DR. PAPAMICHAEL: Thank you very much, Mike. And
6 good afternoon to everybody. Mike is sending greetings,
7 Michael Siminovitch, he is sorry that he couldn't be
8 here, he has jury duty, his experience, the privilege of
9 being an American citizen, I guess. So I am here in his
10 place to talk to you mainly about lighting plug loads.
11 This is a presentation that Michael put together, he
12 trained me yesterday, and here I am to give it now for
13 you.

14 There are three main plug loads that we have
15 identified in lighting, task lighting in office spaces,
16 that is the commercial part, portable lighting in
17 residential, and then some of the high bay lighting is
18 also a plug load, considered as appliances. So I am
19 going to talk today about these three areas where
20 lighting and plug loads intersect.

21 The key efficiency drivers that we see for plug-
22 based lighting, it comes in two forms, legislative and
23 technological. The technological growth that we have
24 been seeing in lighting over the last 10 years is really
25 amazing. We heard from the previous speaker, Dr. Li,

1 that the semiconductor industry, they have a pace of
2 their own, but the lighting industry was an extremely
3 slow moving industry. We increased the fluorescent
4 efficiency by one percent every year since the '60s and
5 '70s until today, we saw LEDs going from 20 lumens per
6 watt in 2004 to now more than 100 in the lab, 150. And
7 this technological growth is truly a major driver that
8 effects plug-based lighting.

9 On the Legislative front, we have the Huffman
10 Bill we talked about there, Title 24 and 20, and the
11 Strategic Plan, several speakers mentioned that, I will
12 not spend more time on that, here it is again. When it
13 comes to commercial Title 24 or the current drafted 1324,
14 there is a potential increase through that on lighting
15 plug loads. Actually, we had Karl earlier mentioned the
16 task ambient approach for office lighting. We would say,
17 we have found over the last decade to be a pretty good
18 and effective strategy that people like and embrace, and
19 the whole idea is you reduce the overhead lighting to
20 provide only ambient light, rather than providing task
21 lighting everywhere into the space. And then you give
22 people high quality task lights that they can place and
23 orient the way that they want to do their task job. And
24 here, the main issue is the basic principle of light, the
25 inverse square law, if I have a task light at this height

1 illuminating my desk, I can do that with 30 watts and to
2 bring the same light here from the ceiling, I need more
3 than 30. So the whole idea is bring the light source
4 closer to what we want to illuminate, and then use the
5 general lighting for ambient lighting. We have gotten
6 repeatedly 50 percent savings over Code that is .5 watts
7 per square foot in many different applications. And
8 people really like it. So we see encouragement of the
9 use of task lighting in the future, any office of the
10 future that will have a change, or will bring a change in
11 the commercial plug loads in office spaces.

12 Here is a diagram that shows the drops that we
13 have done, and this was back in 2007, considering
14 another, if you like, wattage 1.75 watts per square foot
15 being used in existing spaces. The current standards
16 were down at 1.1 or at 37 percent reduction. The best
17 practice that Karl, again, mentioned and it may be key to
18 achieving these goals in the right way and the right
19 time, I think, brings it down to 57. We think that with
20 task ambient lighting, we can go even further down to
21 .50. Here are the 60-80 percent that we want to get from
22 the California Strategic Lighting Plan. The task
23 ambient, as I explained, is something that many people
24 have truly embraced. It wasn't easy to do, the right
25 strategy for it is to spread it evenly. We did first

1 some mistakes to over beam the overhead light and give to
2 people too much of a task light. We've seen relative
3 terms, so if we take one light source in the space and we
4 make it too bright, everything else appears dim. And
5 inversely, if we dim some of the lights in the space,
6 whatever is left will appear too bright, so a good
7 balance is the key to produce the energy savings along
8 with the occupant acceptance.

9 We see two ways that this task ambient approach
10 can help, one is through Title 20, addressing efficacy in
11 lighting quality, I will talk more about this quality.
12 Traditionally, we have been addressing mostly efficacy,
13 and not as much as the quality, and through efficacy,
14 manufacturers gain all of the utility programs if you
15 like, but they lose the end users. Quality is really
16 what the end users are out getting in the market, and we
17 should try to focus more on that. And on the Title 24,
18 the Building Codes, we're going to see changes in power
19 density, and then we can also consider credits for task
20 ambient lighting approaches.

21 Here is a slide on the high bay lighting. I will
22 not see much more, we show the electronic ballasts and
23 the inherent controls that come with electronics
24 controls, that can be used for Demand Response, so this
25 is something that we should be paying attention. Also,

1 with occupancy controls, we can turn lights off or dim
2 them down when there is no one there, and this is again
3 another area where we believe plug loads will be
4 affected.

5 Then we come in to the residential part of the
6 lighting. We talk a lot about residential and, truly,
7 going into spaces like these, you're going to see all
8 kinds of forms and shapes, and interestingly enough, most
9 of them are being sold with a CFL that, when people go
10 home, they just get out and they throw it and they put
11 the light that they like. We did a study back when the
12 Huffman Bill came along to see, is it possible to truly
13 go and have these reductions, and here is from the 2007
14 that moves through 2018, and this is if we really do
15 nothing, and we just keep on increasing the residential
16 square footage, we would see this type of an increase, if
17 you like. But, if we change all of the light sources to
18 40 lumens per watt or more, we can see that, yes, it is
19 possible to clearly meet the Huffman Bill, so it was not
20 something that was impossible; if you use the right
21 sources, you can do it. Unfortunately, the way that we
22 see it, it is not going to happen with halogens and
23 incandescent, which is what we expect people to like,
24 being used to incandescent, it's going to have to be done
25 with CFLs and LEDs. And here is where we need to make

1 sure that we learn from the mistakes that we have done
2 with the CFL type of distribution. We think, with
3 Michael, we share this experience and the explanation, if
4 you like, that the CFL was a disaster mainly because we
5 focused so much on efficiency and cost, and we forgot
6 what it is that people pay when they go into a store to
7 buy something. So we propose, as you will see later, we
8 are really focused on addressing lighting quality.

9 In Title 20, Portable Lighting Wattage
10 Limitation, we have the 2000 1845 lumens per watt, and we
11 expect that this will leave mostly the CFLs and LEDs some
12 incandescent technology can reach that level with
13 halogen, and the IR Coatings to heat up the filament even
14 more. The key opportunities that we see is Title 20 to
15 regulate lamps, we see tremendous promise, if you like,
16 in LED lighting. You can do much much more than we ever
17 expected and there are some pretty interesting value
18 propositions that will make people pay for them, not to
19 save energy, but for the amenities that they can get
20 through it. We can also have voluntary standards and,
21 again, regulating the quality is really a key element and
22 quite a lot of those are going to go in portable
23 lighting, plug lighting. So we truly see residential
24 lighting as a target for efficiency programs and they're
25 subject to massive change.

1 The experience that we had from the past, again,
2 here is the distribution of CFLs vs. incandescent, and
3 you see that the new construction in California, that
4 Title 24 has been highly successful and we got, really in
5 the new construction, 58 percent. We don't really know
6 how many of those stay there. On the break, I heard
7 again another story of many such stories, that people
8 actually take the fluorescent lights out and they put in
9 incandescent, and again, this is a lesson for us to
10 provide better quality. If we see the whole California
11 housing stock, we see that still CFLs is about 20
12 percent, and we are the number one state, so apparently
13 we really need to do more and this is actually pretty
14 good seeing how much we can do with all of the
15 incandescent that we have. And we believe, I think I
16 have it on the next slide, that we can chop off easily
17 with plug loads on lighting about 20-25 percent of the
18 incandescent in existing houses. Yes, here is the chart
19 that shows -- actually, the biggest one here is the table
20 lamps, you can see over here, we have torcheres and floor
21 lamps over here, together they are about 20 to 25 percent
22 of lighting. In 2007, as I showed with CFL use, it was
23 at about 15 percent, and actually I didn't show that, I
24 show it now, it was about 15 percent, and after a lot of
25 effort and a lot of money, by 2010, we were up to 20

1 percent which is a very very slow increasing adoption
2 and, again, we believe that the main reason is the lack
3 of lighting quality mainly on color, temperature, color,
4 appearance, if you like, longevity, quite a lot of the
5 CFLs didn't live to their promise for a long life mainly
6 because they were putting in down lights where
7 incandescent had a great time, they're not scared of
8 heat, but in CFLs the electronics fried. I lost all of
9 the seven CFLs that I put in my kitchen, after I was able
10 to convince my wife and sell her on longevity and they
11 were all gone without six months, and in seven years we
12 hadn't changed a single incandescent, so right now she is
13 into incandescent and there is nothing that I can tell
14 her.

15 So the major barriers with CFLs, one of the first
16 ones was the color, appearance. People were expecting
17 the warm light of incandescent lighting and they really
18 didn't get that. The longevity, I just described my
19 experience, and I heard quite a lot of experiences like
20 that. In certain applications, they will last, but if
21 the luminaire is not designed for them, chances are that
22 they will overheat and die young. Dimming was another
23 interesting issue that came up with CFLs and it's still a
24 very big issue. We all should try to promote dimming and
25 we still believe in dimming, that it is a great strategy

1 to save energy. If I have a dimmer, there is always one
2 way that I can go -- down. And fortunately, most of the
3 CFLs, especially the low cost CFLs that we distributed
4 and we flooded the market, they couldn't do that
5 effectively.

6 Now, with LEDs, which truly have an amazing
7 promise and they are even more efficacious than CFLs,
8 with plenty of things to do, still we can see exactly the
9 same type of issues, the color, appearance, the
10 longevity, the dimming, the lighting quality color, etc.,
11 we really need to address quality issues and bring the
12 consumers into the equation, get the consumers to tell us
13 what it is that they like to do. We believe that with
14 LED lighting, we have already won the efficiency game, we
15 are up to 100 lumens per watt, even with 30 lumens per
16 watt, we can save 50 percent of the electric lighting
17 through lamp replacement. Being at those high levels of
18 100 lumens per watt, we think we can sacrifice 10 and 20
19 lumens, and 30 lumens, to bring the quality high so that
20 consumers go and buy them because they really like it,
21 and for the amenities it provides, rather than accepting
22 it to save the energy and not being happy with it.

23 And this is my last slide where, again, I'm going
24 to make the point pretty fast because many have made it
25 already, that it's the existing homes that really hold

1 the promise on meeting the aggressive goals of
2 California. This is pretty much a generic plot, if you
3 like, and you can see a two percent increase in the
4 growth, and if here we're at 2010, by 2018, we still have
5 more than 80 percent of the actual load being in existing
6 buildings. Thank you very much.

7 MR. LEAON: Thank you very much, Dr. Papamichael.
8 Next up, we're switching topics to Beyond Standards, and
9 we're going to be discussing Alternative Approaches to
10 Appliance Standards for Meeting Energy Efficiency Goals.
11 And Dr. Carrie Armel will be making a presentation
12 remotely. And while Peter is getting that organized, I
13 will go ahead and introduce Dr. Armel.

14 Dr. Carrie Armel is a Research Associate at
15 Stanford's Precourt Institute for Energy Efficiency,
16 where she investigates the diverse ways in which an
17 understanding of human behavior can lead to improvements
18 in energy efficiency. Dr. Armel co-chairs the Behavior,
19 Energy and Climate Change Conference, oversees Precourt
20 Institute's behavior and energy, bibliographic database
21 and website, and teaches courses on behavior and energy
22 at Stanford. In addition to these initiatives, Dr. Armel
23 developed specific energy efficiency interventions that
24 apply behavioral and design principles, and develops
25 measures to evaluate the efficacy of such interventions.

1 Her most recent project involves a collaboration between
2 academic and nonacademic organizations to design and
3 evaluate a technology that takes advantage of Smart
4 Meters to provide feedback to residents on home
5 electricity use. Dr. Armel completed a PHD in Cognitive
6 Neuroscience from the University of California at San
7 Diego, and Post-Doctoral Work in Neuroeconomics at
8 Stanford. In these programs, she employed behavioral,
9 psycho-physiological, and neuroscientific methods to
10 investigate how effect and motivation influence behavior.
11 She most recently completed post-doctorate work at
12 Stanford School of Medicine, translating intervention
13 techniques used in health promotion work into the domain
14 of energy efficiency. Dr. Armel.

15 DR. ARMEL: Hi. Good afternoon. Thank you so
16 much for having me, it's a real honor to be able to speak
17 today. I also appreciate the behavioral comments by the
18 previous two speakers, they're a good set-up and I'm glad
19 to see that people are identifying behavioral issues and
20 the importance of that.

21 So today I'm going to give an overview of our
22 ARPA-E Grant which focuses on residential buildings and
23 ties into behavior, energy use, and also sensor
24 technologies. We have some work on transportation and
25 also small and medium commercial, but the focus of our

1 initiative is on residential buildings. And I guess I'll
2 just say "next slide" for you to queue them forward?

3 MR. STRAIT: That will be fine.

4 DR. ARMEL: Okay. So go ahead to the next slide.
5 So before I tell you about our initiative, I'd like to
6 just clarify that our project doesn't focus just on plug
7 loads, but rather on several types of energy efficiency
8 actions or behaviors that can achieve energy savings in
9 residential buildings, so the purchase and installation
10 of energy efficient technologies, reducing waste,
11 shifting settings, and installing controls, or pairing
12 items, or performing maintenance, adjusting patterns of
13 use and habits, etc. Next slide.

14 So our funding is from the relatively new Federal
15 agency ARPA-E at Department of Energy, which is modeled
16 after DARPA, but focuses specifically on energy. And
17 then we also get funding from CEC. Our initiative has
18 about 20 different projects across 10 different
19 departments, and these departments range from electrical
20 engineering, computer science, mechanical engineering and
21 design, civil and environmental engineering, economics,
22 psychology, communications, education, behavioral
23 epidemiology at the School of Medicine, etc., so it's a
24 very diverse effort. All of the projects center around
25 how to leverage Smart Meter or other sensor data with

1 behavioral approaches to maximize energy phasing. Next
2 slide.

3 So our initiative attempts to address the
4 following problems: first, billions are being spent to
5 produce Smart infrastructure, but without careful
6 consideration of the human element, this infrastructure
7 is unlikely to reach its full potential; and second,
8 energy efficiency is difficult, so figuring out what to
9 do and how to do it is difficult and boring, often times.
10 So how can we address both of these issues? How can we
11 leverage Smart infrastructure to maximize energy savings?
12 Next slide.

13 Our solution is that a smart infrastructure
14 enables quantification, which in turn enables ways to
15 reduce energy use. So, for one, it enables diagnostics
16 for personalized recommendations so that people aren't
17 left guessing what they should do; second, quantification
18 enables a variety of behavioral techniques that were
19 difficult to implement before, for example, feedback,
20 incentives, markets, competition data, visualization,
21 etc., and third, quantification allows us to create the
22 best programs with unprecedented speed, ease, cost, and
23 scale, through objective evaluation of program energy
24 savings and then improvements of the programs over time
25 and their evaluation. Next slide.

1 So how can we achieve these and other benefits?
2 Our initiative links two technologies that have recently
3 become pervasive, the first, as I previously mentioned,
4 the wireless sensors, as indicated in the box on the
5 left-hand side of the Collect and Capture, so these could
6 be Smart Meters, Home Area Networks, gas sensors, gas
7 transportation sensors, hot water sensors, etc. And
8 then, the second technology indicated on the right in the
9 Present and Inform box is web enabled devices like
10 computers, Smart Phones, etc., which can deliver programs
11 to help individuals reduce energy use. We think that, by
12 linking these two through the Stanford engine or
13 initiative, we can realize significant energy savings.
14 Our engine is composed of a technology platform in the
15 red, which includes sensor and networking improvements
16 and a database on analytics. On top of that, in the
17 green, lives our programs or interventions, we have
18 multiple foundational projects, for example, identifying
19 target behavior for recommendations, doing segmentation,
20 etc., and then the programs themselves include media,
21 policy, and community programs, and I'm going to tell you
22 a little bit more about those in a minute. And then, in
23 addition, in the blue, modeling projects evaluate the
24 data from all of the programs to inform future work and
25 policy about which techniques and programs are most

1 effective, where to get the biggest bang for the buck,
2 building, modeling projects, etc. Next slide.

3 So I'll give a quick overview of several of the
4 projects now. I'll just say, we have some pretty sexy
5 projects and graphics, unfortunately, I can't show you
6 all of them today because I need to get permission from
7 the individual projects and I wasn't able to do that
8 quickly over the summer, but I think you'll get a bit of
9 the flavor for what we're working on.

10 So the graph that you see on this slide is a
11 piece of our simple feedback interface project. The data
12 is graphed compared to one's baseline in the past,
13 compared to one's neighbor's energy use, and the user is
14 also given recommendations and sent emails at strategic
15 times, etc., so this is sort of our basic feedback
16 interface, a piece of it. Next slide.

17 As an example for one of our media programs, we
18 have an online game that takes in real world energy use
19 data from Smart Meters into its point system, so this
20 game is called Power House, and the game, you'll see in
21 the graph on the left, the graph of energy use data, and
22 that's, like I said, converted into points, you can
23 compete with your friends in the game through Facebook
24 Connect, etc., and then embedded within the overall game
25 or website are smaller games, so, for example, in the one

1 illustrated on the right, you race around the house to
2 pick the tier to achieve all of the goals in your virtual
3 household with the lowest energy use possible, and in the
4 game, by speeding up time, and by seeing quick feedback
5 in the form of points, that actually are set up to
6 accurately reflect the energy consumption with the
7 different appliances in the game, one can more easily
8 develop habits, so you get reinforced more quickly. And
9 after playing, it's actually rather difficult to leave a
10 room without thinking about turning off lights and TV,
11 etc. So it builds up those habits more quickly. And
12 then within this overall framework, there's also game
13 challenges to reduce real world energy use, like I
14 mentioned. Next slide.

15 We have GLEE, Girls Learning Energy and
16 Environment, which is a Girl Scout Program that teaches
17 the girls about how to reduce energy use. We've just
18 finished implementing the program in 30 troops and are
19 analyzing the data. Half of the troops focused on
20 reducing home energy use, and the other half on
21 transportation and food energy use, and each group serves
22 as a control to the other. The program includes five
23 lessons at troop meetings and a corresponding website
24 which is shown here. At the end of each in-person
25 lesson, the girls create a news video to put on the

1 website, which is intended to draw the parents there,
2 where they can find additional resources related to audit
3 and retrofit programs, etc. etc. Next slide.

4 I'll quickly go through just a couple of other
5 behavioral projects, so one of our Facebook apps allows
6 one to use their energy savings to micro finance
7 individuals through Kiva. Our appliance calculator
8 allows one to easily compute energy costs of their
9 current appliances, as well as any appliance currently on
10 the market to determine when they should make the switch
11 to a new appliance, and what new appliance would be good
12 to purchase. We have a couple of incentives projects
13 that leverage behavioral economic principles to motivate
14 folks to shift energy use, for example, during off-peak
15 hours. Next slide.

16 To support these and other projects, we've built
17 an energy services platform that is a collection of
18 software services. We're hoping to make the software
19 available as a service to Program Developers outside of
20 our team in the coming months. The Energy Service's
21 platform allows Program Developers to easily implement
22 their programs, to assign participant to different
23 experimental conditions, to store various types of data
24 and perform analytics. Next slide.

25 I'm going to mention just one type of analytics

1 that we're working on, that I think is critical to
2 realizing energy efficiency savings, and which is being
3 implemented within the Energy Services Platform. These
4 analytics allow us to take whole home data like that from
5 Smart Meters, and separate it into appliance specific
6 information. We believe that appliance specific
7 information will allow individuals to quickly and
8 automatically identify the changes that would be most
9 effective in reducing their energy use. Studies show
10 that there's 200 to 300 percent variability in energy use
11 between identical housing units due to appliance
12 saturation and lifestyle patterns, and people don't know
13 where it would be most effective for them to make
14 changes. Once we identify what changes they should make,
15 we could recommend or channel them to specific rebates,
16 programs, etc. Next slide.

17 To tie the different pieces together that I've
18 described, we see that community programs like the Girl
19 Scouts and online social networking, etc., at the top,
20 can channel folks to the core analytics and
21 recommendation system indicated in red in the middle,
22 which then channels the folks to the bottom layer of
23 rebates and appliance replacement, or audit programs,
24 etc. The online game, Smart Incentives, and other media
25 programs we and others are working on are depicted in the

1 middle layer and can reinforce the recommendation system
2 and improve persistence in trying to make energy
3 efficiency changes. Next slide.

4 So, just to summarize, there's multiple benefits
5 that sensors such as smart meters could provide, some of
6 which I covered earlier like providing diagnostics,
7 motivating action with enhanced behavioral techniques,
8 and creating best practices for programs. There are
9 several additional benefits. So, the platform could
10 transform program evaluation and significantly increase
11 the diversity of energy programs, it would enable
12 utilities, government, and others to quantify reductions
13 in energy use attributable to a wide range of programs
14 whose impact was previously difficult to measure, thereby
15 diversifying the program toolkit. Additionally, the data
16 collected here and models derived from the data can
17 inform policy and also these programs, the hardware and
18 communication efforts that we're working on, can be
19 refined to be better, more usable to get energy
20 efficiency savings in the future. Next slide.

21 This is just a summary of everyone who is
22 involved currently on our team. I would just like to add
23 one clarification to my presentation because I did
24 mention Smart Meters a couple of times as being useful
25 and, just for the record, although they are -- the amount

1 of disaggregation that can be done at the current
2 resolution of data is fairly limited, and so we do have a
3 policy piece, a policy and technology paper that we're
4 close to finishing at this point that looks at what data
5 resolution, temporal frequency is needed to be able to do
6 different amounts of disaggregation. In other words, get
7 different numbers of appliances identified in the home
8 and the constraints of Smart Meters and what they should
9 be able to achieve and where we should push Smart Meters
10 in the future. Thank you.

11 MR. LEAON: Thank you, Dr. Armel. Will you be
12 able to hold on the line for the comment period?

13 DR. ARMEL: Yes, I will.

14 MR. LEAON: Okay, thank you. All right, let's
15 proceed to our final speaker for this panel, Jonathan P.
16 Williams, a Government Affairs Manager for Intel Corp.
17 Jonathan is responsible for developing, implementing and
18 managing public policy strategies for local, regional,
19 and state government entities and officials, developing
20 legislative priorities and positions on key policy issues
21 for Intel, while engaging and gaining support from senior
22 management, influencing and leading legislative activity
23 through participation in public policy committees,
24 specific and industry associations. Also, protecting and
25 enhancing the Intel brand and corporate reputation

1 through engagement and relationship development with
2 elected leaders and statewide stakeholders. Jonathan.

3 MR. WILLIAMS: Right, thanks very much. My
4 apologies for the heresy, I didn't bring slides; fear to
5 think anybody would bring slides, it would probably be
6 the guy from the high tech company. But being the last
7 person on the agenda, I'm not going to punish you any
8 further with a 27-slide deck, which is what I passed on.

9 I'm going to break my comments really into just
10 three parts, and I'm anxious to turn it over to the Q&A
11 because there's been so much on this panel that it kind
12 of dovetails with what I'd like to touch on.

13 First, let me just thank the CEC for the
14 invitation. I really appreciate Intel being thought of
15 in this context. We've been doing a lot of work in the
16 energy efficiency space over the last several years. I
17 heard semiconductors mentioned; the pace of the
18 semiconductor industry, I think you may have touched on,
19 is pretty exciting, and what we're doing with energy
20 efficiency, I think, is pretty exciting, as well, so I
21 appreciate being thought of in that context.

22 I want to thank the CEC specifically for the work
23 we've done recently with former Commissioner Byron and
24 staff and the consultants on Smart Meters, Home Energy
25 Management Systems, and Harinder Singh and Ken Ryder's

1 team for the work that we're doing with them right now on
2 battery charger requirements, both here and at the U.S.
3 DOE level.

4 Let me give a quick Intel infomercial, I'll tell
5 you a little about Intel, what we're doing from a
6 corporate perspective, from an energy efficiency and our
7 product perspective, and then I'll kind of take it to the
8 final piece of the remarks, which is kind of where we
9 think the industry can go, and it really fits in with
10 what you just heard on this panel.

11 From a company perspective, you may know that
12 Intel is the largest purchaser of renewable energy in the
13 U.S., we have been for the last four years, something
14 we're pretty proud of. We have the number one spot on
15 the EPA's Green Power Partner Program, something we're
16 proud of, and we're getting about 50 percent of our
17 domestic U.S. energy from renewable sources, which I
18 think is pretty impressive, considering we're a major
19 U.S. manufacturer. So, those are a few things about the
20 company from a corporate perspective that we're proud of.

21 But where Intel can make the biggest difference
22 is in our products, the energy efficiency that we can
23 deliver through our products, and a couple data points on
24 that before I get into some specifics. You look at the
25 number of installed -- the PC installed bases, we would

1 call it internally, basically the number of PCs globally
2 -- one billion in 2007; it's going to be two billion in
3 2014, right? But the energy consumed by that second
4 billion PCs is half of the energy consumed by that first
5 billion, a tremendous amount of energy efficiency
6 happening within our products today, and that's obviously
7 a good thing.

8 You look at what is happening in the server
9 space, right, in the enterprise, where you have in 2005 a
10 rack of 20 Intel Xeon servers, which is our standard
11 server processor, a rack of 20 of those is now being done
12 by a single -- excuse me -- 20 racks of Intel Xeon is now
13 being done in 2010 by a single rack. The energy
14 efficiency delivered through that, as well as the cost
15 savings for our corporate customers, is extremely strong.
16 Now, why is that happening? This is very intuitive, and
17 I think it will make sense as far as just your own
18 personal buying habits. From a consumer perspective, I
19 go back to - I've been with Intel for 14 years and one of
20 the jobs I had back in 2002 was the role of our Centrino
21 processor, if anybody remembers that. That was the
22 processor that basically had the integrated WiFi. And it
23 was the compelling notion at the time, was the integrated
24 WiFi, right? What that has engendered is, you know,
25 reduced battery consumption, greater energy efficiency

1 for all of the obvious reasons, right, because you want
2 that connectivity remotely, you don't want to be working
3 remotely and have a battery life of two hours, right, so
4 we've been driving greater energy efficiency and greater
5 battery life into our product for years and years and
6 years, just to meet the usage demands. Now, that's
7 happened with things like WiFi and other things, as well.
8 You look at Solid State Drives, if anybody is familiar
9 with Solid State Drives, as opposed to the traditional
10 hard drive, the spinning hard drive, right? Now, a
11 spinning hard drive, as you would suspect because it's
12 moving parts, consumes more energy; you move to solid
13 state drives, you're getting better battery life, you're
14 getting more energy efficiency. These things are all
15 happening right now and we're actually - I was on a call
16 earlier before I got here, we're having a hard time
17 making enough solid state drives to meet the demand, so
18 we're happy with what we're seeing in the market as far
19 as demanding the kind of energy efficiency that we've
20 been talking about today. Very briefly, at the server
21 level, what we're seeing from our customers at that level
22 is the exact same thing, you know, transistors,
23 microprocessors, continue to get faster, they continue to
24 get more energy efficient, and computing continues to get
25 smarter. At the server level, you see that through

1 things like virtualization, which is simply having
2 multiple servers, but being able to offload the work of
3 multiple servers onto a single server, simply through
4 software. And that's happening, and that's causing
5 significant energy efficiency, energy cost reductions, as
6 well as just cost reductions, in general, from having to
7 buy less technology, right, so these are all things that
8 are happening because of the product enhancements that
9 Intel is making, that the entire industry is making. And
10 it's a good thing in the context of what we're talking
11 about today.

12 So bottom line, though, as all that would kind of
13 suggest, the best way to drive enhanced energy efficiency
14 is to upgrade those older systems, right, if you're
15 working off of systems, you know, CRT monitors, right?
16 Simply moving to flat screens, as all of you know, is
17 significant energy savings with that, right? Getting off
18 of an older system that isn't being effectively managed,
19 where it's, you know, the intelligence of computing where
20 it knows you've left because, you know, it'll shut down
21 after two minutes, it'll go into hibernation after a
22 couple minutes if you're not using it. That kind of
23 intelligence can be managed into newer systems, and if
24 you're managing a large enterprise environment, you know,
25 an upgraded set of systems will deliver energy efficiency

1 through that kind of intelligent computing. So, those
2 kinds of things are all happening in the market today.

3 What -- and this really fits in, I think, most
4 specifically with the last comments -- what else can
5 happen? You know, where is the technology going that is
6 outside of the context of maybe the more traditional
7 technology roadmap that I've just touched on? What we're
8 seeing is Intel has been involved in a few different
9 programs I think are particularly interesting, and I just
10 want to share very briefly with this audience, 1) in
11 France, we're working with a consortium of companies on
12 developing positive net energy buildings, buildings that
13 aren't zero energy, but they're actually generating
14 energy. And this is a result of some regulations in
15 France that are about a decade or so away. And what
16 we're seeing that I think is most compelling is, without
17 the buy-in of the users within the building, you're not
18 going to get there, right? It has to be at that
19 individual user level. No amount of energy efficiency at
20 the appliance level, or kind of building regulation
21 level, is going to get you there unless you have the buy-
22 in of the users and the people within that building. And
23 that's been a pretty compelling message from the research
24 we've done. We're also involved with the Oregon
25 Sustainability Center, which is a really neat public-

1 private partnership. I lived in Oregon for about 10
2 years, and I know this one pretty well. The idea that
3 Oregon is designing what they're calling a "Living
4 Building" that is trying to get to zero net energy, as
5 well as some really cutting edge sustainability efforts
6 around things like water re-use, right? And we're seeing
7 the same thing there, without getting the buy-in of the
8 users to take, you know, you can get double-digit energy
9 efficiency gains through managing the users and helping
10 them understand ways to deliver energy efficiency at the
11 micro level. And the way we've been talking about it
12 internally, and actually I heard something very similar
13 to this in the last presentation, making energy personal.
14 Making it a personal thing that you think about. And
15 we've developed a software application that we've just
16 recently rolled out early this month, actually, called
17 the "Personal Office Energy Manager," POEM is the
18 acronym, of course, and anybody in high tech knows
19 everything gets an acronym. The Personal Office Energy
20 Manager is a software application that you can install
21 for your users, where they can track their own personal
22 energy consumption as it relates to the use of their
23 system, the use of the printer. They can weigh in on how
24 they feel about the office climate, and that data can be
25 aggregated at the floor level, the building level, and

1 there's any number of incentives that you could introduce
2 to help folks understand ways that, you know, their own
3 personal energy fits into the energy use of the other
4 folks in that building.

5 I heard some comments on the prior panel toward
6 the very end that I thought were really interesting, the
7 idea of peer pressure vs. just kind of increased
8 awareness, and I wouldn't go to the peer pressure sense
9 of it because I don't think that's the right mechanism by
10 which to view this, but having a better familiarity with
11 kind of your own environment, in how folks on the same
12 floor as you, how they're doing. You know, I believe in
13 technology and I believe in technology's ability to
14 increase user control, user awareness, and give folks
15 more clear understanding of their own personal energy
16 usage and how they can do a better job managing it. And
17 I think that's the real promise of technology as far as
18 kind of going beyond the kinds of standards that we
19 traditionally talk about. I think there are
20 applications, there are software applications that are
21 being developed today, you just saw some in the earlier
22 presentations, and in the work that we're doing with this
23 Personal Office Energy Manager. These things are
24 happening, they're being developed today, and I think
25 they're going to create this new area that we haven't

1 traditionally looked at that is really going to be an
2 opportunity to drive the kind of energy efficiency that
3 we're most interested in.

4 Two last things and then I'll turn it over to the
5 discussion. We're doing similar work in China, and the
6 reason I simply say that is because there's really global
7 interest in this and we think we're going to try and
8 deploy somewhere on the order of 30 million Home Energy
9 Management Systems over the next five years in China to
10 help the Chinese market better understand their energy
11 usage, so we're particularly excited about that. And
12 lastly, you know, Intel has got a venture capital arm,
13 many of you may know, and we've invested more than \$150
14 million in about 20 clean tech companies that are doing
15 everything from solar to battery technology, to the kinds
16 of software that help lead to the things like this
17 personal office energy manager. So our interest in this
18 is extremely broad. We're pretty proud of what we're
19 doing from a product perspective, but also in these kind
20 of cutting edge areas, and I will be happy to turn it
21 over to the discussion and take some more questions on
22 that.

23 MR. LEAON: Thank you, Jonathan. I want to thank
24 all of our panel members for their thought provoking
25 presentations, very informative, and I think there was

1 some common themes there that we can discuss during the
2 open discussion period here.

3 To begin with, I guess I'd like to start with a
4 question to the panel about key challenges. In the draft
5 staff report for the appliance program, specifically, one
6 of the key issues that we identified within the framework
7 of our regulatory program of standards compliance and
8 enforcement, related directly to enforcement authority
9 and the need to have greater enforcement authority than
10 we currently have under statute. We have found through
11 market survey reports that there is a high degree of non-
12 compliant products entering the marketplace in
13 California, so obviously a key going forward and meeting
14 efficiency goals for buildings is to capture the energy,
15 all of the energy savings we should be capturing. And
16 the one recommendation that's currently in the draft
17 report relates to that, asking for a fine in a citation
18 authority, and there is a bill in the Legislature right
19 now that would provide that authority, Senate Bill 454.
20 And we think, in terms of capturing all the savings we
21 possibly can, that's going to be a key thing for us to
22 have moving forward within our existing program.
23 However, during the presentations, I think it's clear
24 that there are a number of themes that are emerging that
25 are not necessarily something we can address through our

1 existing program, whether it's a smart technology,
2 whether it's addressing public acceptance, whether it's
3 engaging the public to change their behaviors and find
4 ways to get them involved in managing energy.

5 So, I guess the question I would like to pose to
6 the panel is, what do you see as the key challenges
7 moving forward in regard to managing plug loads? And
8 it's not clear to me that, necessarily, all of this can
9 be addressed within our existing regulatory framework.

10 DR. LI: Maybe I can jump in first. We had one
11 behavior study conducted in our university with the
12 residential area, so what we found out in that study is
13 we collected a lot of information, but the information
14 somehow cannot be easily understood by the users; for
15 example, when we presented data to them, a kilowatt hour,
16 that's the typical unit we used, and the user was asked
17 the question, "Kilowatt hour? Kilowatt what?" They said
18 they do not understand that unit. When we explained to
19 them one kilowatt hour equivalent to a double cheese
20 hamburger, 860 calories, and your home is eating more
21 hamburgers, they understand it. So the question here is
22 how do we really present the information to the users so
23 that it can be easily understood. And we have lots of
24 sense of technology and Smart Meters, and so on, the
25 information how to present the information, and the user

1 can use that information as a way to make actionable
2 information, and they can make decisions, and so far we
3 have not reached that level yet. We are at the very
4 beginning of really solving the problem, so that's why I
5 think it's having the consortium and industry, utilities,
6 and Energy Commissions, and universities, and so on, we
7 work together. And I think, especially if we're talking
8 to the K through 12 students, that is the opportunity for
9 us, they are the angels, they are the agents of change,
10 and somehow if we present the information in a way they
11 understand, so "a hamburger is obesity," and "there is an
12 obesity issue in our society," and they can understand
13 that. They can personalize that information. And we
14 have not done the work yet. So I think this is a really
15 tremendous opportunity for us to really embark on that
16 problem, and it will also create new markets for all of
17 us.

18 MR. PENNINGTON: Thank you, Dr. Li. I think from
19 our perspective at the Energy Commission, one of our
20 challenges is in this era of resource constraints,
21 budgetary constraints, we're really focused on our core
22 activities of developing Standards, ensuring compliance
23 with those Standards, and enforcing those Standards. And
24 I think the area where we're venturing into is the need
25 for collaborative approaches to do education and

1 outreach, and that is certainly an area where we would
2 like to do a lot more, but again, we're challenged by
3 resource constraints. So, let me ask this question, and
4 one of the things I think we should be looking at are,
5 what are the opportunities out there to establish
6 collaboratives, to work on outreach and education?

7 MR. WILLIAMS: So I'll jump in and at the risk of
8 this sounding awfully self-serving, from a computing
9 perspective, you know, two percent of the global carbon
10 emissions have been attributed from outside analysts to
11 information in computing technologies, right? Leaving 98
12 percent among the wide other sectors, but the data has
13 also shown that every one additional kilowatt hour
14 associated with computing leads to a 10X increase in
15 energy efficiency in kind of reductions in other
16 computing, you know, referencing your slides, you show
17 the medical technologies and, you know, the emergence of
18 those, what are the -- and you hit on, I think, the exact
19 issue -- how do you measure the energy savings that are
20 delivered because more people are able to get care at
21 home? Right? You know, we think they're tremendous. I
22 think there's a lot to be learned, not just from a
23 healthcare cost savings perspective, but keeping cars off
24 the road, keeping people out of hospitals, keeping people
25 in their home where there's a greater likelihood that

1 they won't need urgent care and tap into all kinds of
2 additional costs associated with that. But studying
3 these kinds of emerging technologies, having the data, is
4 something we struggle with and, if we're struggling with
5 it, I can imagine that regulators are struggling with it
6 significantly. Right? So I do think there's a
7 tremendous opportunity to work more closely with the
8 private sector to understand where we are going and where
9 the technology is going. I liked your line, as well, you
10 know, the pace of change in the industry continues to
11 surpass the ability to keep up via regulation. Right?
12 It's just really hard to do that. We understand that.
13 I've seen that my entire career at Intel. The idea,
14 though, that we could work more closely together to
15 understand, you know, the significant accomplishments
16 that have been made through energy efficiency and where
17 the critical mass may lie, outside of the traditional
18 energy efficiency models, right? Because we think the
19 pace of energy efficiency in the computing industry has
20 been extremely rapid, you know, estimates as much as
21 3,000 percent increases in energy efficiency over the
22 last 30 years for computing. There's no other industry
23 in the world that can match the computing industry when
24 it comes to energy efficiency. The gains and the savings
25 have just been completely enormous. So that being said,

1 how do we take the power of computing to deliver energy
2 savings across the broader industry? That's actually, I
3 think, the most exciting challenge that we've been
4 looking at internally. And we've done some very good
5 work with the CEC, we've done some very good work through
6 PIER, we think there's tremendous opportunities through
7 the initiatives that are being established and absolutely
8 would like to work more closely with this agency to help
9 understand where we're going.

10 DR. ARMEL: I had a response to the question
11 posed -- I don't know if somebody wants to respond to
12 that, but I was going to respond to a question posed by
13 the moderator --

14 MR. LEAON: Yes, go ahead.

15 DR. ARMEL: -- about you had mentioned
16 collaboratives that could be established to make better
17 user leveraged funds. And I had a question, perhaps this
18 is an inappropriate place to mention this, and forgive me
19 if it is, but my understanding is that the Public
20 Utilities Commission provides repair dollars in three-
21 year cycles to use utilities for utility programs related
22 to energy efficiency, and I've done a little bit of
23 inquiring as to how those funds get allocated and stuff,
24 but it seems like, at least I'm finding it sort of
25 complex and difficult to figure out, you know, how that

1 works, and I wonder if perhaps -- I don't know if there's
2 anybody there from the PUC, or whether folks from CEC
3 have some insight on this, but whether some of that
4 funding could actually be potentially opened up for
5 research or other initiatives that might kind of expand
6 the scope beyond the more traditional utility programs.

7 MR. LEAON: Let me ask our utility reps if they
8 can respond to that.

9 MR. HIGA: I'm not sure if I completely
10 understand the question. Its funding for doing more than
11 the traditional incentive programs or...?

12 DR. ARMEL: No, I think this is funding that is
13 typically earmarked and there's three-year cycles, and I
14 guess we're about half way through one currently, and
15 there's talk of having a lag time of about a year when
16 this cycle ends, before the next cycle begins, and
17 there's discussion now between the utilities and the PUC
18 about for the next cycle where those funds should get
19 allocated for a utility program. I apologize that I
20 don't have a way of referring to it as a specific type of
21 program, I'm not -- the process is somewhat enigmatic to
22 me. This is for marketing dollars, education dollars
23 related to energy efficiency.

24 MR. HIGA: Right, well, there is, I think, I'm
25 not sure if you heard some of the previous presenters

1 from the CPUC, but there's a Workforce Education and
2 Training Program that currently exists that does address
3 a lot of these training types of issues. That being
4 said, you know, the next program cycle has -- the
5 planning for that has not begun yet, so I think any input
6 that you have to what the Workforce Education Training
7 Program consists of and what are its program elements,
8 I'm sure that there will be, you know, input would be
9 welcome. I'm sure there will be upcoming workshops that
10 will be noticed, you know, in the upcoming future, and I
11 don't know if there's anybody from the CPUC on the line
12 right now that also wants to address that.

13 MR. STRAIT: Cathy Fogel did have her hand
14 raised, she may have some contribution to this subject.

15 MS. FOGEL: Can you hear me?

16 MR. STRAIT: Yes, we can.

17 MS. FOGEL: Yeah, thanks for your question,
18 Carrie. I can give a brief response and I'm happy to
19 meet with you separately, as well. Yeah, I work at the
20 CPUC and I find the whole process fairly confusing, as
21 well, so you know, I'm joking a little bit, but it is
22 something that is a problem because it's so challenging
23 for people who aren't deep into it to understand this,
24 but as Randall mentioned, we are beginning to plan for
25 our sort of guidance that the CPUC will be providing for

1 the next program cycle, and most of the what's called
2 "Record Development" needs to take place in about the
3 next nine months for that, which means new ideas, report
4 information, data that would inform the Commissioners
5 guidance need to get formally into our proceeding record
6 in that time, so it's really what the previous speaker
7 was talking about, how the marketplace moves just much
8 more quickly than the regulatory framework is really able
9 to accommodate, and this issue of, you know, particularly
10 the behavior programs, which is really just kind of
11 exploding what's possible coupled with competing
12 technology. You know, I think it's a challenge for us to
13 figure out how to get these innovative programs assessed
14 and funded, whether that's via the utility programs, or
15 via third-party programs, or via some other mechanism,
16 there's also potentially -- research could potentially be
17 conducted on behavior-based programs in the utilities'
18 emerging technologies programs.

19 And I kind of had a question back for Carrie,
20 although I don't want to dominate the conversation of how
21 are some of these behavior change programs -- how do the
22 researchers currently see them to be best implemented?
23 Because utilities, not to mention the regulatory
24 agencies, are pretty slow moving beasts, we're not really
25 known particularly for innovation over the years, so do

1 you foresee these being implemented by utilities, or by
2 other third parties? And do you see them mostly as
3 marketing and education initiatives, as you mentioned?
4 Or getting into this [quote unquote] "savings framework"
5 that the CPUC currently has for utilities, in which we
6 have adopted goals, savings goals that they have to meet?

7 DR. ARMEL: I would think it could definitely be,
8 especially with the measurement component, related to the
9 work that I mentioned, that work that has a strong
10 measurement component could fit into the latter type of
11 programs that you referred to. The utilities, I agree
12 that they're slow moving, we've had a lot of interactions
13 with them and there's been strong interest, but our stuff
14 seems a little bit outside the envelope to some, I guess.
15 So I don't know, there's been some interest in perhaps
16 pilot programs with the utilities, we're independently
17 doing kind of direct recruitment to folks, tapping into
18 diffusion channels like the Girl Scouts and other
19 channels. I think there could be a role for energy
20 services companies, or companies like EnerNOC and CPower,
21 so I think there's a variety of channels, and I don't
22 know whether the PUC funds are tied specifically to the
23 utilities, or whether they're open to other channels, as
24 well.

25 MS. FOGEL: Yeah, they are open to other

1 channels, as well. Twenty percent -- currently, the
2 policy rules state that 20 percent of the funding needs
3 to go to non-utility programs.

4 DR. ARMEL: Okay, well, maybe we should continue
5 the conversation offline and I would be curious because
6 I've come across also some other entities doing really
7 interesting stuff that might be useful for you to be
8 aware of, maybe we could organize like a lunch meeting
9 where I could get some groups together to come up and do
10 presentations to expose the PUC, if that would be useful.
11 I'm not sure of the best mechanism, but perhaps we could
12 have another call and you could make some
13 recommendations?

14 MS. FOGEL: Sure, that would be great.

15 DR. ARMEL: Super.

16 MR. LEAON: Okay, thank you. All right, let me
17 ask if there are any comments in the room at this point?
18 Okay, if you could state your name, organization, and
19 please provide a business card for the Court Reporter.

20 MR. RAYMER: Okay, thank you. I'm Bob Raymer,
21 Senior Engineer with the California Building Industry
22 Association. And my comments will focus on plug load,
23 but then lapse back into energy efficiency and zero net
24 energy. One of the cost concerns that we have right now
25 is, under current technologies, there's rather high costs

1 projected for reaching Zero Net Energy. And a big chunk
2 of that is the size of the PV system that needs to be put
3 on the roof to account for the plug load. And so,
4 obviously it behooves us over the next eight to 10 years
5 to do everything we can to reduce that plug load.

6 Now, getting into the energy efficiency
7 standards, we're in the middle of probably historically
8 large increase in stringency that the CEC will probably
9 be proposing quite shortly. And we're seeing out in the
10 field compliance with the performance methodology, the
11 performance compliance approach for the standards is by
12 far the one that is most commonly used. I would have to
13 say that probably 98 percent of the homes that comply
14 with the Energy Regs use the performance approach.

15 One of the things we need when we're looking at
16 the Standards is we need compliance options. Now, the
17 measures that create that performance budget that we have
18 to meet are arrived at through looking at what is put
19 into the proscriptive packages for each of the 16 climate
20 zones, and I know this kind of gets into the minutiae of
21 the Energy Efficiency Standards, but in this particular
22 go-round, a great many of the compliance options that
23 we've been using for the last three to six years are
24 being moved out of the compliance option column and over
25 into the proscriptive column. And so, although you can

1 still do tradeoffs, there's far less over in the
2 compliance option column that we can tradeoff anymore.
3 And so, to the extent that the Energy Commission can
4 somehow quantify certain benefits of either appliance
5 efficiency on things that were not currently regulated,
6 or plug load methodology systems, plug load reduction
7 devices, there could be a great market right away within
8 the next two to two and a half years. In essence,
9 industry is going to want to reduce that plug load, it is
10 in our best interest from a cost perspective to reduce
11 the plug load. And if we can somehow early on through
12 the energy efficiency standards somehow get compliance
13 credit for tradeoffs with other provisions that we may
14 not be able to do for the marketable home, that's going
15 to be very helpful. And so there is a marvelous
16 opportunity within just the next 24 months. So, with
17 that, we'd be very supportive of that kind of effort.

18 MR. LEAON: Thank you. Other comments in the
19 room?

20 MR. NESBITT: George Nesbitt. So plug loads have
21 definitely been an ever increasing problem and a
22 difficult one to address. Some additional items. Home
23 exercise equipment, of course, it's also in places people
24 pay to go to, to exercise, so you've got treadmills with
25 fans that you can obviously hear running, even though no

1 one is on the treadmill and hasn't been on them for a day
2 or more, who knows? And also, you know, we now have home
3 theaters in every room, so the media centers, the DVRs,
4 the TiVos, the satellite boxes, and one is not enough,
5 we've got to have one everywhere, so it's a big problem.
6 So we need to address it as we can from Title 20, you
7 know, basically anything that is plugged in shouldn't be
8 using energy when it's not producing anything of value.
9 I mean, there's just really no reason. From the
10 behavior, or what I sometimes try to refer to as
11 "operational" comes to -- none of my plug loads are
12 plugged in unless I'm actually doing something with them,
13 so if I'm not charging my cell phone, my computer, what
14 not, it's usually not plugged in. And that comes down to
15 a human choice and a human action, which is harder, but I
16 think there's a lot of effort in some of these feedback
17 things that will help.

18 I think lighting is in some ways residentially an
19 under-appreciated increasing load. My house has one
20 light fixture in the center of every room, I cannot go
21 into a house that's been remodeled that does not have a
22 half a dozen recessed lights in the kitchen, or the
23 bathroom, or the living room, or the dining room, or the
24 master bedroom suite. So, I think as part of the Code
25 update, I think there is more wattage in the average

1 California kitchen from the survey they did than there is
2 total wattage in my whole house. So, I'm 100 percent
3 CFL. I haven't figured out how to disable my oven light
4 yet, I just haven't been able to get the damn thing apart
5 to disable it. And through the day, people have said, to
6 get to net zero, we obviously need to consider more than
7 just the physical building, it's everything in it.

8 So under our definition of "Net Zero," which we
9 defined three years ago on HERS 2, we do include the plug
10 loads and the lighting. And we need to really make that
11 essentially the Code. I mean, we need to roll the rating
12 system into the full Code and include those plug loads
13 and the lighting and allow tradeoffs. Although,
14 currently you get no credit for having an energy
15 efficient top loading washing machine. And then we'll
16 have to ask the question if non-res has plug loads, but
17 there's nothing you can do to gain credit in it as far as
18 I know, so then the question will be do we need a way to
19 have credits. You know, what kind of technology or
20 systems would we allow that would generate some sort of
21 credit that somehow hopefully enables you to reduce your
22 plug loads? So that really needs to be a part of that.

23 I think people think, well, Net Zero is -- it's
24 very abstract to everyone right now. My 1923 house
25 upgraded will only need about a .9 kilowatt PV system to

1 reach Net Zero under our definition, which is not
2 humongous, although to get there you've got to be at
3 least 50 percent above Code.

4 And then I think the other thing, you kind of
5 mentioned above Code programs. One of the difficulties I
6 think we have as we ratchet up the Code, we've also got
7 all these programs that are pushing beyond Code -- Green
8 rating, the new CalGreen, various REACH Codes that are
9 allowing jurisdictions to adopt even greater levels of
10 above Code, and if we're going to ratchet up the Code by
11 30 percent, which really means for a lot of people we're
12 ratcheting it up by even more, and so at some point there
13 is no REACH. Because, like I say, I don't think you can
14 get above 75 percent above, I just -- I've done enough
15 modeling that at the moment there's just nothing more to
16 throw at it to get above that, so there is a limit to how
17 far above our current baseline we can get. And at some
18 level, we have to have some room above it if we're going
19 to have REACH Codes, or maybe then the Code just becomes
20 the bare minimum again, although we've just raised the
21 bar real far.

22 MR. LEAON: Okay, thank you.

23 MR. STONE: Nehemiah Stone with Benningfield
24 Group. Something you said, Randall, really intrigued me
25 because I hadn't thought about it before, but it seems

1 pretty obvious; to the extent that California is
2 prevented by preemption from going beyond the appliance
3 standards, the Federal Appliance Standards, it's going to
4 be difficult to get to Net Zero. But it also started me
5 thinking, we were preempted from water heater standards
6 years ago when it was set really low at .52 energy
7 factor, and what we did in the Code, in the Building
8 Code, was to say, "Well, yeah, you can put that in, but
9 if you do that, you're going to have to put a blanket, an
10 insulating blanket on it." And that did not change the
11 appliance regulation, but it effectively changed what the
12 minimum water heater was that people installed.

13 The parallel here that I'm wondering about, if we
14 don't ask for any higher levels of efficiency for washers
15 and dryers and whatever else, but we do say, "If you're
16 going to sell them in California, they need to have
17 controls in them, Smart controls that will communicate
18 with a building EMS," that allow you to make the choice
19 to have it turned off when you don't want it on, then I'm
20 wondering if that is not in conflict with the Federal
21 preemption because we're not saying anything about the
22 efficiency, you can still operate that same efficient
23 equipment, it's just in California it has to be able to
24 be turned off if you choose to set your system up to do
25 that. I'm wondering if you can respond to that, Randall,

1 or if that has to be punted to the Energy Commission, and
2 particularly maybe to the attorney that is handling
3 waivers and preemption issues these days.

4 MR. LEAON: This is Mike, yeah, I think we would
5 have to look at that. It's an interesting concept and I
6 think it's one that is definitely worth investigation.

7 MR. HIGA: Yeah, I'll reiterate, you know, the
8 example that I had before is that, you know, on task
9 lighting, you know, we're trying to figure out a way to
10 regulate task lighting in offices and it's hard to do
11 that as a plug-in device, but one of the things we
12 thought about, and I worked in an office that had this,
13 and that is at night time, certain outlets were swept off
14 which the test lights were plugged into, so we want to --
15 and I just think that's good practice and has been good
16 practice for 20 plus years, so I think if we could
17 facilitate that type of control in offices in the Code, I
18 think that would be an opportunity. So, certainly the
19 water heater blanket is a good example. The other one is
20 the economize on air-conditioners. We cannot require
21 homes to have anything higher than a SEER 13 or you can't
22 have a home -- you have to make it comply with the SEER
23 13 air-conditioner. And the same goes for larger air-
24 conditioners, there's also efficiency limits on where you
25 can go, but in California, we could require economizers

1 to put on there. So we're looking at other ways of
2 retrofitting. As John knows, we're looking at putting on
3 variable speed drives on evaporator fans and
4 refrigeration units, and things like that. So I think --
5 the point, though, is we're looking at all possible ways
6 to drive down energy use and not run into preemption
7 issues. And I think there are some creative ways we can
8 do that, we need to explore that more.

9 MR. MCHUGH: Hi. My name is Jon McHugh.
10 Actually, some of the things that have just been
11 discussed are things that we're looking at right now for
12 the Title 24 Standards in regards to plug load controls,
13 so either scheduling controls, or other controls where
14 you have a single point of control that controls, you
15 know, half the plugs in the house. And I think this goes
16 back to what Bob is talking about, are that there are
17 additional opportunities and potentially tradeoffs. And
18 one of the issues with having additional control that I
19 think impacts potentially the appliance standards,
20 especially for a lot of consumer electronics that are
21 currently not covered, is the issue of what Dr. Li
22 brought up earlier about the issue of the clock, and the
23 issue is, you historically, "Oh, we've got to keep the
24 juice to our microwave, otherwise I'm going to have to
25 reset the clock and all the settings, and the VCR, and

1 everything else." And so, from a perspective of
2 appliance standards, I think that's actually a pretty
3 ripe opportunity to look at sort of the interaction
4 between exterior controls that might be applied through a
5 building standard that's actually providing intermittent
6 electricity, or intermittent power to the device, and
7 that it maintains all of its functions. And my
8 understanding is that there is currently a proposal in
9 front of Title 20 that removing the standards from
10 lighting controls, which used to be in Title 24 into
11 Title 20, and those have a series of requirements about
12 non-volatile memory that perhaps makes sense for a much
13 broader range of appliances beyond just lighting
14 controls.

15 MR. LEAON: Okay, thank you. Well, we're
16 approaching the end here. I would just like to remind
17 everyone that -- oh, Pat, I'm sorry, let's get to you
18 before I make a closing statement.

19 MR. EILERT: I'll be just really quick. You
20 know, preemption -- I just want to emphasize this issue
21 -- and you look at the example Kosta threw up a little
22 while ago which is we're sitting on a 45 lumen per watt
23 standard for general service lamps in 2018, that's sort
24 of ridiculous, okay, that and you can name sort of a
25 dozen other examples where we could go to more stringent

1 standards for various appliances and plug loads in the
2 state, sooner than that. It's a huge problem long term
3 and, you know, sooner or later every major end use is
4 going to be covered at the Federal level with sort of,
5 again, ties our hands here in California. So, we need to
6 develop some sort of collaborative between the State
7 utilities industry to figure out what we can do here in
8 California to maybe figure out some sort of approach
9 that's actually interesting to industry by, you know,
10 turning California into some sort of a policy laboratory
11 where -- and figure out what's the value to having a
12 state like California step out ahead of the nation in
13 terms of energy efficiency in more of a general sense and
14 not just on a measure-by-measure sense. We need to think
15 a little bit more broadly about this issue because, right
16 now, you know, we're really stuck, we're not going to get
17 to Zero Net Energy in a cost-effective manner and a lot
18 of the other state goals are going to be a lot harder to
19 reach their preemption, you know, the lighting goals, as
20 well.

21 MR. LEAON: Thank you, Pat. Okay, I want to
22 thank our panel members today, and I want to thank the
23 audience, those in the room and those on the phone. I
24 thought it was a very productive workshop today. I would
25 like to encourage Stakeholders to submit written

1 comments, they are due July 29th. The Workshop Notice has
2 the directions for how to submit your written comments.
3 Electronic comments have to be supported by 10 copies of
4 written comments, so take a look at the notice on
5 directions on how to do that.

6 I would also like to provide the audience a heads
7 up that we are -- the Energy Commission will be moving
8 forward with a new Scoping Order for developing Standards
9 for appliances, we're wrapping up the battery charger
10 proceeding, and we anticipate we'll be noticing the
11 formal rulemaking sometime next month, start the 45-day
12 public comment period for that, and we are also planning
13 on holding a Scoping Hearing sometime in August to
14 discuss which appliances should be addressed next in a
15 proceeding for new Standards. With that, that concludes
16 the workshop and, again, thank you everyone for
17 participating and -- well, I see we have one more
18 question in the room here. So let's go ahead and take
19 that.

20 MR. STRAIT: Cathy, your hand is still raised.
21 Do you have an additional comment you wanted to make?

22 MS. FOGEL: No, not me.

23 MR. LAEON: All right, just checking. Thank you.
24 Okay, that concludes the workshop. Again, thank you,
25 everyone, for participating, in particular our panel

1 members .

2 (Adjourned at 4:55 p.m.)

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

