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STATE OF CALIFORNIA - THE RESOURCES AGENCY
 BEFORE THE
 CALIFORNIA ENERGY COMMISSION (CEC)

In the matter of,)
) Docket No. 12-BSTD-03
)
 Voluntary California Quality)
 Light-Emitting Diode (LED))
Lamp Specification)

Staff Workshop
 Voluntary California Quality Light-Emitting
 Diode (LED) Lamp Specification

California Energy Commission
 Hearing Room A
 1516 9th Street
 Sacramento, California

Thursday, October 11, 2012
 10:03 A.M.

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Gabriel Taylor, Title 20 Lighting Lead

Also Present (* Via WebEx)

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Michael McGaraghan, Senior Project Manager, Energy Solutions

George S. Tagnipes, Non-Residential Programs, CPUC Energy Division

Terry McGowen, Director of Engineering, American Lighting Association

Lorne Whitehead, Professor, University of British Columbia, CIE CRI Committee

Gary Trott, VP of Product Management, Cree Lighting

Pam Horner, Senior Director Government and Industry Relations, Osram Sylvania

Tim Okeefe, Specification Engineer, GE Lighting

Willem Silleviss Smitt, Sr. Director Product Marketing, Soraa Inc.

Pat Eilert, Codes and Standards Program Manager, Pacific Gas and Electric Company

Jim Parks, Program Manager, Sacramento Municipal Utility District

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INDEX

	Page
Introductions	
Gary Flamm, Supervisor, Building Standards Development Unit, CEC	6
Overview	
Michael Siminovitch, Director, California Lighting Technology Center, University of California, Davis	11
General information about the Voluntary California Quality Light-Emitting Diode (LED) Lamp Specification; The process.	
Owen Howlett, Lighting Specialist, CEC	32
Gabriel Taylor, Title 20 Lighting Lead, CEC	50
The Matrix: Comparison of Energy Star and the California Quality LED Specification.	
Michael McGaraghan, Senior Project Manager, Energy Solutions	52
The California Public Utility Commission (CPUC) and the use of upstream programs	
George S. Tagnipes, Non-Residential Program, CPUC Energy Division	60
Experts on Color Quality Metrics and Testing	
Terry McGowan, Director of Engineering, American Lighting Association	63
Lorne Whitehead, Professor, University of British Columbia, CIE CRI Committee	77

INDEX

	Page
Industry Comments in Regard to the California Quality LED Specification	
Gary Trott, VP of Product Management, Cree Lighting	87
Pam Horner, Senior Director Government and Industry Relations, Osram Sylvania	94
Tim Okeefe, Specification Engineer, GE Lighting	99
Willem Silleviss Smitt, Sr. Director Product Marketing, Soraa Inc.	100
Lunch	102
Utility Comments in Regard to the California Quality LED Specification	
Pat Eilert, Codes and Standards Program Manager, Pacific Gas and Electric Company	103
Gary Fernstrom, Pacific Gas and Electric Company	104
Winsey Kan, Pacific Gas and Electric Company	106
Jim Parks, Program Manager, Sacramento Municipal Utility District	107
Vireak Ly, Southern California Edison	108
Jim Gaines, Philips Lighting Company	110
Public Comment	116
Adjournment	179
Reporter's Certificate	180
Transcriber's Certificate	181

P R O C E E D I N G S

1
2 OCTOBER 11, 2012

10:03 A.M.

3 MR. FLAMM: So, good morning everybody. I'm not
4 going to start the main meeting. I just want to go over
5 some of the logistics while I'm waiting to see when
6 Commissioner McAllister will be able to be here.

7 So, a few housekeeping items, for those not
8 familiar with the building, the closest bathroom is out
9 the doors to the right.

10 There's a snack bar on the second floor. And
11 I've got to stop and answer the phone because my
12 secretary's calling me.

13 I'm sorry, so the Commissioner has another
14 meeting he's in and we're not sure when he's going to
15 get down here, but it's on his calendar.

16 The snack bar on the second floor if you want
17 coffee, snacks. At lunch time there's lunch in the
18 snack bar.

19 Also, if you go down P Street, if you go down O
20 Street there's some restaurants on both of those streets
21 that you can find within walking distance.

22 (WebEx interruption)

23 So, I'm going to continue while we're trying to
24 figure out how to get the people on line to be able to
25 hear us.

1 In case of emergency follow us out of the door.
2 We're going to be going to the park that's caddie corner
3 to this intersection here.

4 I would like to suggest to everybody that if you
5 go out to the door on the right it's alarmed and you
6 will be very conspicuous, everybody will look at you and
7 say, well, why did you go out that door, it's alarmed.
8 Please go out the front door.

9 And those are the logistics.

10 And I'm going to start the meeting now and going
11 to -- my name's Gary Flamm, I'm the Supervisor of the
12 Building Standards Development Unit. I'm really excited
13 to be here, I'm excited that all of you are here.

14 I've been involved in lighting for a number of
15 years. I started at SMUD in the mid-eighties, and
16 handing out 34-watt energy saver lamps and CFLs. And,
17 you know, it's like 26 years ago.

18 And became the lighting lead here for the last
19 three rounds of Title 24 and a couple rounds of Title
20 20, and so no good deed goes unpunished, so I was
21 promoted to be a supervisor.

22 And so I want to introduce a couple of other
23 staff. We've got Owen Howlett is the new Lighting Lead
24 for Title 24. And we've got Gabriel Taylor, who is the
25 lighting person for Title 20.

1 And Commissioner, would you like to say
2 something?

3 COMMISSIONER MC ALLISTER: Sure.

4 MR. FLAMM: So, okay, see if that works. Go
5 ahead and say something. I was trying to press mute and
6 it wasn't working.

7 COMMISSIONER MC ALLISTER: Okay, yeah, exactly.
8 So, I really have to commend Gary on all the progress
9 we've made since the standard was the candle.

10 MR. FLAMM: Thank you.

11 COMMISSIONER MC ALLISTER: Just kidding.

12 (Laughter)

13 MR. FLAMM: And the oil lamp and --

14 COMMISSIONER MC ALLISTER: Yeah, exactly, the
15 whale blubber lamp, yes.

16 MR. FLAMM: The whale lamp.

17 COMMISSIONER MC ALLISTER: But, no, I mean the
18 history with lighting and the Energy Commission is
19 really incredible. I've mostly been on the outside
20 watching all the developments and learning along with
21 the Commission.

22 And now that I'm here and it's been five months,
23 now, since I came to the Commission, I've really gotten
24 to know the staff somewhat better, and not as much as I
25 will, I'm sure, but there's a lot of good work going on.

1 And I think the CFL market transformation process taught
2 us a lot, collectively, about what's needed. And how we
3 have this incredible opportunity for LEDs, and they're
4 involving fast. And we want to try to apply some of the
5 lessons to avoid the pitfalls, and try to realize the
6 upside as much as possible.

7 And I really commend Michael Siminovitch and the
8 team here at the Commission for kind of nurturing this
9 idea and really pulling it forward, and coming up with a
10 concrete product, reaching out to the PUC and together
11 working on a strategy that we think has a lot of
12 potential.

13 And this hearing is part of that, it's a very
14 important part of that process, and looking forward to
15 all of your contributions to develop a standard -- you
16 know, markets are pretty -- markets can be very chaotic
17 and a little bit ugly, and so we want to -- without
18 inhibiting them, we want to try to encourage them the
19 good parts, and try not to encourage the bad parts.

20 So, I think there's a lot of really interesting
21 experience in the room, for sure, and insight about
22 what's going to work best.

23 And, also, now that Commissioner Douglas is here
24 I want to acknowledge her contribution to getting this
25 going and working with staff as well.

1 So, I'm very excited to be here. It's all
2 related, right, so we have AB 758, we have Title 20,
3 Title 24. Lighting is, you know, an integral part of
4 all of those things.

5 And as we improve our existing housing blocks,
6 we improve the new housing stock we -- this will be
7 relevant.

8 And certainly the utility programs that are
9 going to be leveraging the standard in the near term are
10 going to be integral to all of those.

11 So, thanks Gary, and without further ado we can
12 get started, unless Commissioner Douglas wants to say
13 some words.

14 Well, thank you, Commissioner McAllister. I
15 just wanted to welcome everybody here to the Energy
16 Commission for this workshop. This is an issue that has
17 been very close to kind of my heart, as we've moved it
18 forward. I think that we have a real opportunity here
19 to help send the right signal to the market, and help
20 send the right signal to consumers, and to really use
21 this approach to help us achieve our energy efficiency
22 goals in a major way.

23 So, I thank everyone for being here today and
24 thank staff at the Energy Commission, and the Public
25 Utilities Commission for their hard work to get us to

1 this point.

2 And with that, let's get started.

3 MR. FLAMM: Thank you. So, I wanted to let
4 everybody know that this is being mic'd onto the web.
5 So, anything you say may be over the waves, so be
6 careful what you say next to the microphones.

7 Also, where this is being recorded, the court
8 reporter here, so what I'm going to ask is whenever you
9 get up to speak, please speak into a microphone, either
10 the cordless microphone or one of the microphones that
11 are around the perimeter here.

12 Push the button to make sure the microphone is
13 on.

14 And the first time you speak, if you would give
15 to the court reporter one of your business cards, so
16 that the reporter can spell your name and affiliation
17 correctly.

18 And we're going to introduce people as we go
19 along. And I'm going to ask all the speakers to use the
20 lapel mic, so that you can be webcast.

21 And with that, I'm going to introduce our first
22 presenter, which is Dr. Michael Siminovitch, Professor
23 from the University of California, Davis.

24 MR. SIMINOVITCH: Thank you, Gary. Thank you,
25 Commissioners for inviting me here. I consider myself

1 Gary's graduate student on this project and I really
2 thank him for the opportunity for allowing me to
3 participate on this project with our industry and our
4 utility partners.

5 So, I first want to sort of just introduce this
6 with the idea that California's got big goals. And if
7 you look at that, the house building bill, I think this
8 is one of the country's largest opportunities and
9 largest goals for our energy efficient lighting.

10 And 50 percent from the 2007 for indoor
11 residential lighting by 2018 is really going to change
12 culture. We're really going to need to embrace this
13 whole project in order to get there.

14 To give you a little bit of a feeling of where
15 this is, this graph is just a very simple explanation
16 looking at time and looking at the 50 percent savings,
17 and looking at where we're at now.

18 And so this is sort of the percentage savings
19 reaching towards 50.

20 Now, we're down here where we're in the 10
21 percent, we're about 10 percent of the way there.

22 A business-as-usual strategy, and what we've
23 tried to do -- and, again, this is based on lots of
24 input from the industry and the utilities.

25 If we do business as usual with all our great

1 programs, and Title 24 and Title 20 we're going to see
2 this kind of gentle increase. And if we really want to
3 get serious about Huffman, we need this upward
4 trajectory. And the upward trajectory will get us
5 towards 50 percent, but it's really going to involve
6 going deep and getting very engaged into next generation
7 technology.

8 and the road to Huffman is really going to be
9 paved by embracing solid state technology. And I think
10 for residential the only practical way there is going to
11 be to quickly transform this marketplace to solid state
12 LED, Edison-based technology. We really need to wrap
13 our arms around this if we're serious about achieving
14 Huffman goals.

15 Unfortunately, consumer expectations and
16 preferences have not been met by CFLs. And when you go
17 into a marketplace like this, you'd be hard-pressed to
18 find anything that's more than 15 lumens per watt. And
19 when you ask them for something that's energy efficient,
20 they have something in the back that they might show
21 you.

22 So, the idea here is the compact for us, in our
23 minds, fell well short. And there's a number of reasons
24 for that, one is typically moving from incandescent to
25 compact fluorescent is a departure in key attributes.

1 It's a key departure in color attributes, color
2 rendering, uniformity, dimming optical.

3 And so, again, we've spent a lot of time looking
4 at these. There's been lots of discussions on this.
5 Some of the key data, you know, from the Energy Star
6 reports show that if you look at satisfaction there's a
7 pretty wide part of America that is dissatisfied with
8 CFL technology.

9 So, again, this is showing all the way from
10 somewhat satisfied, satisfied, or very dissatisfied.
11 But again, there's a pretty big gray area of folks here
12 that are not keen on CFL technology.

13 Now, digging further on this it's a broad range
14 of different product attributes, but having to do
15 principally with photometric properties. Not a lot of
16 light output, poor color, hum and flicker, dimming size
17 and fit.

18 Now, some of these inherently can be solved or
19 realized with next generation solid state technology.

20 Really digging into this further, I think it's
21 kind of a sad commentary in terms of the amount of
22 investment, and time and effort that we've put into
23 this, that only nine percent of homes are what we would
24 called transformed, okay.

25 And so this is also based on Energy Star data.

1 It's a relatively small fraction considering all the
2 years that we've been digging into this.

3 Part of our culture is sort of wrapped around
4 this problem and I think this really sums it up,
5 "homeowners will get used to CFLs." Well, clearly they
6 did not. And this is from a large advocacy group here
7 in the United States.

8 We have positioned, as a broad group, that
9 moving forward we need to start to encourage the very
10 best in terms of lamp technology. And the future rebate
11 programs that see the future need to be tied to some
12 quality specification.

13 If we're going to be very serious about energy
14 efficiency, we need to push and incentivize the very
15 best that America can make. And that's based on three
16 broad pillars, it's improved color, dimming, and
17 longevity.

18 And we know that the consumer experience for
19 lighting in the home is tied to those three.

20 Why this process? We believe strongly that a
21 quality-based specification should encourage the very
22 best.

23 And why do we want to do that? We want to help
24 the industry develop and market the best lamps. And so
25 having early rebate programs tied to a very high quality

1 specification supports the industry and allows the
2 industry to exercise the very best, it gives the blue
3 sky to do this.

4 Two, it helps successful utility programs grow.
5 In other words, the utilities are on the front lines of
6 getting this new technology into people's homes.

7 It builds trust with the consumer. We have a
8 lot of homework to do with consumers. We've told them
9 this stuff is great and will last long. Clearly, it has
10 not, so we need to build trust with the consumer.

11 Ultimately, a quality specification will
12 transform the marketplace. The approach that we've been
13 working on for the last year is there's four principles.

14 One, we'd love to start this as an Energy Star
15 Plus approach, okay, and the idea is that there's many
16 elements of Energy Star which are good, and what we want
17 to do is leverage the strength and add to it a higher
18 bar for color quality, dimming and longevity.

19 What we've done up to this point is we've
20 developed some draft specifications and Gary's team has
21 been working on developing specifications for a
22 voluntary quality metric.

23 We want to start now with an initial
24 specification and then over the years refine that
25 further with research. This is a moving target. We

1 want to draw a line in the sand today and say this is
2 what we think is quality, but we want to refine it with
3 future research as the technology gets better.

4 And last, we want to educate the market. We
5 have a lot of education to do in this process.

6 Again, I've said we've wrapped this around the
7 concept of improved color quality, which is based on two
8 constructs. One is consistency and this is the
9 difference between lamps, and the other one is color
10 rendering, and that is how good you look when you look in
11 the mirror, and then, of course, dimming and life.

12 The incumbent technology, and this what people
13 have learned to expect, has a very high color quality.
14 It's close to 100 CRI. Lots of literature searches and
15 reviews, most of our bedrooms and bathroom lighting all
16 very high CRI light sources.

17 Our visual system has evolved under a continuous
18 high CRI light source. So, our biology in our eyes is
19 built around high color quality lamps.

20 High color quality lamps dominate in the
21 residential marketplace and they dominate in the retail
22 marketplace. It's clear that the preferences for light
23 sources in these types of environment are high color
24 quality.

25 I got this from one of our industry partners,

1 one of the largest lamp manufacturers in the country
2 cites, "Excellent CRI is critical in settings where it
3 is important that people appear natural."

4 Okay, obviously, that's residential
5 applications.

6 80 CRI is acceptable in our offices. Okay,
7 that's accepted. We think there's a lot of room for
8 preference studies in offices for higher CRI, but today
9 it's acceptable, okay.

10 So, what I'm going to do is I'm going to show,
11 just very quickly, a quick demo on this. So, what I'm
12 showing on this side is an incandescent lamp and there's
13 a red sample here and this is a standard color sample,
14 and a standard green sample on this.

15 And again, this is not meant to be super
16 scientific. What I did is I brought in a few apparatus
17 from school.

18 And first I'm going to start with a fairly
19 standard LED Edison lamp. Okay, this is commercially
20 available on the marketplace today, you can buy this and
21 put this into your home.

22 But I want you to see here is two things. One
23 is -- and I asked my students on this last week and they
24 all -- I asked them which one appears different, okay,
25 and I think that's pretty easy, okay.

1 And you very definitely see that the red is
2 highly saturated, okay, red. The red is very highly
3 saturated.

4 And the other, standard green, also very
5 saturated, okay.

6 Now, I'm going to switch over from a
7 commercially available LED lamp to what I would call an
8 A quality Energy Star lamp, okay.

9 Now, the differences aren't so pronounced, but
10 certainly the red is much more saturated, okay. And
11 when the solid angle gets smaller and you actually
12 experience this close up, it's much more apparent.

13 But the reds are much more saturated on the left
14 and the greens are much more saturated. And later today
15 you should come up and see this.

16 But this is an Energy Star, LED, commercially
17 available today.

18 Okay, now I'm going to switch over to -- I want
19 you to disregard the beam distribution on this. But the
20 lamp on the right is a 95 CRI, commercially available
21 LED lamp. And if you sort out the distribution issue
22 here, you'll see that the reds are very closely
23 saturated, okay, very hard to tell the difference.

24 The 95 CRI, commercially available LED, green is
25 also very highly saturated.

1 Okay, let's move to the -- the other issue with
2 color is consistency. So, there's rendering and
3 consistency. If I have these two lamps and table lamps,
4 how different do they look?

5 So, let's start off with esthetic. What we see
6 here is a standard lamp and the other lamp, the distance
7 away, is a seven-step ellipse in terms of how wide apart
8 it is in terms of consistency.

9 So, right now Energy Star with say this is an
10 acceptable amount of deviation between two lamps. So,
11 if you have two samples in your table lamps, this is
12 Energy Star. This is acceptable by Energy Star, this
13 level of difference.

14 Let's go to the fourth. This is the fourth
15 step, okay. So, the fourth step is the beginning
16 language within the California standard. Okay, the
17 California standard says four is the first -- the first
18 step, is our first phase, okay.

19 And we're going to research further. But here
20 you can see there's much closer agreement on those two
21 cards. There's still -- most people can see it as a
22 marked difference.

23 This is two step. In other words, these lamps
24 are different from each other, but they're different by
25 two step. Okay, now it's very hard to discern the

1 differences on this.

2 Now, what we want you to do is we need to do
3 research. Certainly, the four is the starting point.

4 Turn them all on, please. What you see here, I
5 would ask you to pick out the Energy Star lamp.

6 MR. FLAMM: Can you angle that a little bit?

7 MR. SIMINOVITCH: Yeah, I'm sorry. You're
8 welcome to come up and see this. We tried to get it so
9 it was a much larger solid angle, but it's tricky.

10 Now, again, this is a very limited population
11 and we tried to be fair about this and tried to be very
12 standard about this, but you're welcome to go into this
13 in detail.

14 So, where are we today? Okay, I showed you what
15 color consistency and color rendering issues are, why
16 they're important. Where are we today?

17 We have looked at 20 lamps, broadly,
18 commercially-available lamps. Okay, and again it's not
19 all the lamps, it's what we've looked at, at our
20 laboratory.

21 We have taken 20 of those lamps and measured
22 them in detail, backwards, forward, with all kinds of
23 measurements. And eight of those lamps are close to the
24 California lighting specifications, they either surpass
25 or very, very close.

1 So, we know that there's lamps that are
2 commercially available that are very close.

3 Here's kind of a distribution looking at CRI.
4 So, this is color rendering index, it's one of the
5 metrics that's used.

6 So, what we're doing is we're showing here, is
7 this is population of 80, population of 80 and down to
8 60.

9 And here's the 85s and above, and these are the
10 lamps that are close, either exceeding or close to at
11 least one component of the color quality metric. So,
12 there's definitely lamps available to do this.

13 One of the points to take away from this,
14 there's a widespread of color, just like there is in the
15 CFI marketplace, we're going to see the same kind of
16 thing in the LED market space, we're going to see a
17 great range of quality.

18 I'm going to finish up on just some recent
19 developments that are helping to inform this.

20 Commercial retail applications are moving
21 quickly and being educated towards high-quality LED
22 products. In the retail space people like high color
23 rendering products, and they value it, and they
24 understand it and that's where the marketplace is
25 moving. They are moving and the industry is moving to

1 that, so that's already a high -- these things are
2 commercially available.

3 You'll notice in this fine print it says CRI 95.
4 So, there's applications and there is technologies.

5 Energy Star -- we've paved this as an Energy
6 Star Plus approach. Energy Star, now, and this is based
7 on recent discussions, is exploring higher quality
8 specifications. The needle is now moving, okay, so the
9 idea is I think there's -- this needle is moving.

10 And there is flexibility on efficacy. When you
11 give higher color quality, you give on efficacy. But
12 this marketplace is not one that we need to worry about
13 efficacy. Most of the light sources are in the 12 to 15
14 lumen per watt region, so anything 50 and above, or 40
15 and above is a massive home run for the State.

16 We're going to hear a lot on cost and this is an
17 important issue. And it's going to be this technology's
18 too expensive, we can't do it, we can't afford high
19 quality in the home, okay.

20 One, all of the major energy efficiency
21 technologies that California has helped bring to the
22 marketplace, all the way from CFL lamps, down lights, T-
23 8s, occupancy sensors, have all experienced a 50 to 70
24 percent reduction in cost after programs, after rebates,
25 after specification. So, we expect to see the same

1 dynamic occurring in high color quality products.

2 (Off-record comment)

3 MR. SIMINOVITCH: Either partially, or stemming
4 from or growing from -- okay, I'm out of time.

5 MR. FLAMM: So, if you ask a question it --

6 MR. SIMINOVITCH: This is kind of close.

7 MR. FLAMM: Yeah.

8 (Laughter)

9 MR. SIMINOVITCH: You learn to be flexible.

10 MR. FLAMM: When you ask a question, I ask that
11 you turn on your mic and identify yourself, please, so
12 it can be webbed and also so the court reporter know who
13 has talked.

14 MR. GREENBERG: All right, this is Richard
15 Greenberg who just made that faux pas. And I'd like --
16 the question was, basically, the price reduction is as a
17 result of the incentives, not as a result of incentives
18 bringing down the regular price.

19 And Michael's response was?

20 MR. SIMINOVITCH: No, I think there's both
21 things going on. There are things that have happened in
22 absence of and it's been just a standard or a code, and
23 it's dropped in price. And then, in addition, rebates
24 have been brought in to bring the cost down even
25 further, so both things have happened.

1 Occupancy sensors in bathrooms are a classic
2 example. Those were \$85 technologies, they're now \$45
3 technologies. And that hit the marketplace in an
4 absence of a rebate. I know that happened because I did
5 it.

6 And there was a quick rebate on it that brought
7 it down to \$20.

8 So, this is my last slide, but I think we're at
9 a position now, in this dialogue, is that California has
10 the opportunity to move this from a consumable product
11 to a durable product.

12 And this is one of my -- I wanted to say this,
13 but actually one of my industrial partners said this.
14 And I think California's on the forefront of this
15 opportunity where instead of something that's low cost,
16 energy inefficient, but makes really great light, we
17 need to have something that is in there for 10, 15, 20
18 years that has amazing quality.

19 So, Gary, I used up more than my time so --

20 MR. FERNSTROM: Gary, can we ask one more quick
21 question?

22 MR. FLAMM: Okay, I'm going to ask to limit
23 questions for right now because we're already off on our
24 agenda, we're behind.

25 There will be an opportunity this afternoon to

1 ask all the questions that you have, and I'll stay here
2 until they kick me out. What I'm concerned with is that
3 we're going to really get behind.

4 I imagine we could take a few quick comments.
5 Again, if you do make a comment, please identify
6 yourself every time and please give to the court
7 reporter your card. Okay.

8 MR. FERNSTROM: Okay, so Gary Fernstrom
9 representing PG&E with a quick question.

10 Michael, your illustration and example was
11 excellent. You described the difference in color
12 temperature and MacAdam Ellipses, a variance around
13 that.

14 I wanted to know if there was any influence of
15 color quality also involved in that illustration?

16 MR. SIMINOVITCH: Yes. I think this top -- the
17 top demonstration was purely about the difference, it
18 wasn't about quality. It was about the difference in
19 perception.

20 The bottom demonstration was about how colors
21 were rendered, how red -- how red did it look or how
22 green did it look.

23 MR. FERNSTROM: Okay, so the top was strictly
24 color temperature.

25 MR. SIMINOVITCH: It was color variance within

1 CIE space. So, it's tried to keep a constant on the
2 back body curve, except it's just movement, the
3 difference between it. That's it, okay.

4 MR. FERNSTROM: Thank you.

5 MR. FLAMM: Mr. Feit?

6 MR. FEIT: Aaron Feit. I have a couple of
7 questions and I'll try to do them quickly. The first
8 question that I have is your idea here is to get to this
9 50 percent savings by 2018 and what I see happening here
10 is you're trying to limit the amount of product that's
11 going to get out there, even good product that is Energy
12 Star second generation approved, and I'm not
13 understanding this.

14 So, my questions are, one, how can you say that
15 efficacy is not important when you're trying to save
16 energy?

17 I have an e-mail here -- I have an e-mail here
18 from CREE, advising me that to go to 90 CRI I lose
19 between 20 and 25 percent efficacy. So, right off the
20 bat we are taking that type of -- let me just finish my
21 questions and then you can answer them all.

22 MR. SIMINOVITCH: Sure, absolutely.

23 MR. FEIT: But, so right off the bat we're
24 taking 20 to 25 percent away in efficacy. If you want
25 to get to the same efficacy, we either have to add more

1 LEDs, which will add a lot of cost, or we have to drive
2 the LEDs harder, which will also add cost because we'll
3 have to change.

4 MR. SIMINOVITCH: Good.

5 MR. FEIT: Let me just get to my points. I'm
6 the on the time, you can take as much as you want.

7 MR. SIMINOVITCH: Sure.

8 MR. FEIT: The next question I have is in your
9 presentation you said there were X amount of lamps that
10 met the 90 CRI. I took the 123 lamps that are in the
11 report, that you said would be close or met. Out of the
12 123 lamps, I have 2,603 lamps on the lighting facts,
13 that's where you got your 123 number from in the report,
14 126 of those lamps had 90 CRI or higher.

15 Out of that, 108 of those lamps failed between
16 the color temperature that you're expecting. I even
17 gave 175 plus and minus. So, between that 2,700, so
18 there were 108 of those. Nine of those had a .9 power
19 factor.

20 Going down my filters, there was one lamp that
21 passed Energy Star and passed your new specification.
22 One lamp. That lamp happened to be a CREE lamp that
23 retails for well over \$100.

24 So, if you're going to try to get this product
25 into the market, you're going to have to rebate \$90 plus

1 per lamp to get that into the \$10 range.

2 MR. SIMINOVITCH: Not necessarily, it's a moving
3 target. Let me address your first question.

4 The data that I showed up here, this is data
5 that we have in our lab and I'm trying to give a broad
6 view on this.

7 On the efficacy question, the reality is that
8 80, 85 percent of our homes are between 12 and 15 lumens
9 per watt. Efficacy, quite frankly, doesn't matter in
10 that marketplace. We've pushed efficacy uphill on this.

11 What we need is something that people actually
12 like, that's 40 lumens per watt, 50 lumens per watt.

13 In terms of actually changing California, we
14 need to get rid of the heaters, the 12, 15 lumen per
15 watt light sources into something that people actually
16 like.

17 It's like a massive home run at 40 lumens per
18 watt, massive. We want to change our culture.

19 MR. FEIT: You might as well stay with halogen.

20 MR. FLAMM: Again, we can be very technology
21 neutral about this, but there's a freight train coming
22 where we can help guide this to actually address it.

23 Now, if you have an LED that's at 10 watts or 12
24 watts, it's immaterial whether it's 10 watts or 12
25 watts. If it's a 12 watt and it's got amazing color

1 that people actually use, so what if we give up two
2 watts. It doesn't matter. We're competing against 65-
3 watt BR lamps, 60-watt A lamps.

4 So, I think the idea is that the efficacy
5 differential is in the noise.

6 I think Juan is going to talk about this more so
7 than I. I just wanted to sort of give sort of an
8 overview, so let's turn this over to Juan.

9 MR. FLAMM: Juan's not on the --

10 MR. FEIT: Can I just make one more comment?
11 It's a freight train and I think that freight train's
12 gotten away with --

13 MR. SIMINOVITCH: Yeah, so the freight train's
14 referring to the fact that there's an enormous
15 opportunity with solid state lighting, there's this
16 whole massive move to relighting our places of work, our
17 homes, our schools to solid state lighting.

18 And it's coming very, very quickly. What we
19 need to do is make some course corrections and reinforce
20 these opportunities now, before it runs away from us.

21 There are huge factories gearing up for this.
22 And this could have all of the problems that we saw with
23 CFL, except a lot worse.

24 MR. FEIT: Okay, well, one more comment and then
25 I'm done.

1 There are two lamps here. One is a 90 CRI and
2 one is an 80 CRI. And I saw the pictures that you used
3 in your presentation and here's those two pictures. And
4 nobody will be able -- no consumer is going to know the
5 difference. No consumer is going to know the difference
6 and I'm not understanding why you're switching from 80
7 to 90 CRI at 20 percent less efficacy for --

8 MR. SIMINOVITCH: So, let me just -- the
9 dialogue is not whether it's 80 to 90, the dialogue is
10 80 to 100 because the incumbent technology is 100, and
11 that's where the dialogue needs to start.

12 It's not the differential between 80 and 90,
13 it's between 80 and 100.

14 Because if we're going into a marketplace and
15 saying people have a hundred, I'm going to give you 80
16 and we're going to hope that you're satisfied.

17 The same argument is that if you put 90 in,
18 people have a much higher probability of being satisfied
19 with the technology than they do with 80. It's a very
20 simple construct.

21 MR. FLAMM: Could I interject some process here,
22 please? We have a lot of presentations today and I
23 suspect a lot of the questions are going to be answered
24 through that. And I'm going to ask that the dialogue be
25 limited to, you know, what is necessary.

1 We want to hear from you. There's two purposes
2 for this staff workshop. One is to present to you what
3 it is we're proposing and the second is to hear from
4 you. We want to hear from you. And we're going to ask
5 for written comments within two weeks of this workshop,
6 so if you want to talk to us, you can call us, you can
7 talk to us, we want your -- we want your feedback.

8 And so the goal that we're hoping, that staff is
9 hoping is that we can get this approved as an Energy
10 Commission document by the end of this year.

11 This is not a standard. This is not a
12 rulemaking standard, this is a document. We're willing
13 to recognize what's a high quality LED lamp.

14 So, I'm going to ask to limit, please, the
15 comments while we run through all of these
16 presentations. We've got a significant amount of
17 presentations. And we will listen to you. We will
18 listen to you, as long as you want to talk we will
19 listen to you. Okay?

20 And the next presenter is going to be Owen
21 Howlett, from the Energy Commission.

22 MR. HOWLETT: So, good morning. My thought here
23 is to give you an introduction to the specification that
24 we have developed. We've got a draft specification,
25 which is at the end of the table there. If anybody

1 doesn't have a paper copy, there are paper copies
2 available. So, stick your hand up and somebody will get
3 a paper copy to you, if you want one.

4 So, what I'm going to do here is run through the
5 context of this specification, what it's intended to do,
6 what's in it, and also what lies behind it in terms of
7 what research we did and what data we collected to
8 arrive at this first draft.

9 Obviously, what we don't want to do is write
10 language, whether it's a standard or a specification, we
11 don't want to write anything that's arbitrary or
12 capricious; we want to have something that's based on a
13 technical analysis.

14 And so what I'm going to present to you this
15 morning is what we have so far. If you all have data,
16 you have analysis that you want to present, you can
17 present that as written comments. We're going to have a
18 pretty full discussion this afternoon on these topics.

19 Oh, I don't have an assistant. Thanks Gabe.

20 MR. TAYLOR: You're welcome.

21 MR. HOWLETT: So, about the context here is that
22 as the Energy Commission, we have a lot of long-term
23 energy savings goals, so everything we do is in the
24 context of trying to achieve very significant reductions
25 in energy use over the long term.

1 So, for us the important context of this
2 specification is how does it help to create the kind of
3 change that we want to see in five or ten years' time?

4 Now, we also have to do that in the context of
5 utility programs and markets that are going to be around
6 next year, and the year after that in the short term.

7 So, we need to do something that's not
8 disruptive in the short term, you know, it's practical
9 in the short term, but it also contributes to and
10 doesn't compromise our long-term goals. And that's a
11 bit of a balance and I hope that what I'm presenting
12 today will show you how we are trying to balance those
13 out.

14 Michael already went through our long-term goals
15 to some extent. The specifics are probably not that
16 important, but I want you to understand that in order to
17 get to these goals we -- we are not going to get to
18 these goals by pushing products on people that they
19 don't necessarily want. We need market pull, as well as
20 standards to get this to happen.

21 And the goals, what we think of a near-term
22 goals is 2018. Six years away is, you know, pretty much
23 our next horizon. And we're also thinking of what we do
24 beyond 2018.

25 So, the background to this is obviously the CFL,

1 the CFL market, which the CFL is our current high-
2 efficacy lamp for residential and small commercial.

3 We have -- we've achieved some market
4 penetration, some consumers like CFLs. I like CFLs,
5 I've got a ton of them. We're all consumers so I bet
6 some of you have CFLs as well. Some CFLs are pretty
7 good products.

8 But there's a lot of remaining market for CFLs
9 that has not been transformed and that market is
10 directional lamps, spotlights, where CFLs don't do a
11 good job, and that's where the LED really has a huge
12 role to play in the short term.

13 In California we have a lot of, frankly,
14 expensive evaluation efforts that look at the utility
15 programs and say have these utility programs been
16 effective? Have they been cost effective? Have they
17 achieved the kind of market penetration that we want to
18 see?

19 We have limited data from those evaluations. We
20 don't have no data, we don't have complete data, it's
21 kind of patchy.

22 The property evaluations is that we have
23 somewhat superficial answers to somewhat superficial
24 questions. So we can say with great confidence that
25 when somebody picks up a CFL in a store we know what

1 they think about it, we know what elements are guiding
2 their decision to purchase that CFL.

3 What we don't know about is in the long term,
4 when somebody takes that CFL home and they put it in
5 their house what do they think about it in the long
6 term? Do they move it around from socket to socket? Do
7 they replace it with something similar? Do they try and
8 replace it with something better? How often do they use
9 it? Do they like the color, do they like -- does the
10 thing fail early? All those kind of questions, we don't
11 have good data on that.

12 The limited data that we do have, there's
13 essentially only one good in-depth study of long-term
14 consumer acceptance of CFLs. And what that study found
15 was that -- and I don't want to keep harping on color,
16 but color keeps coming up as an element.

17 It found that color was much more of a
18 significant factor in that long-term evaluation than it
19 was in any of the short-term evaluations.

20 Color was given kind of a comparable weighting
21 by consumers to other things in the short-term
22 evaluations. But in the long-term evaluation it came
23 back as a major factor, a huge factor.

24 So, we don't know, but our indications are that
25 this is probably a key stumbling block.

1 And then Energy Star comes in in 1999-2000, and
2 then it's revised every few years after that. Energy
3 Star really kind of tames the jungle and gets a lot of
4 bad products out of the market.

5 But despite Energy Star coming in and setting
6 that solid floor on the market, we still don't have the
7 kind of transformation that we want to see.

8 Even for the lamps the Energy Star is very good
9 at capturing, so even on the directional lamps, the
10 straight forward lamp replacement, we only have a 30 to
11 50 percent saturation of that at the most.

12 What we do have, from the utility evaluations is
13 lessons learned. And here's a sample of those lessons
14 from a pretty extensive DOE study.

15 We -- in terms of the LED market, we really
16 haven't done a lot of the background work that those CFL
17 program evaluators called for us to do. So, we don't
18 have a lot of the fundamental consumer research. We
19 don't know that we have great products that will not
20 create a lasting bad impression.

21 The term I keep hearing is poison the well. We
22 mustn't poison the well by giving consumers the
23 impression that an LED is much like a CFL. It's
24 basically a not very attractive light that the State,
25 that the government wants to push on you, or the utility

1 wants to push on you for their own reasons to save
2 energy.

3 Okay, so next slide. So, what are we doing,
4 what is this specification about?

5 Well, first off it's a specification, it's not a
6 standard. This will not ban any lamps from the market
7 in California or anywhere else.

8 What it will do is it will inform the utility
9 programs, and we have Jeorge Tagnipes, from the CPUC,
10 who later on is going to give you an overview of how
11 this specification will affect utility programs.

12 It's also a little different from Energy Star.
13 Energy Star is a consensus-based standard arrived at on
14 the basis of what is cost effective given color
15 technology.

16 And what we have in the specification is we're
17 trying to lead that a little more toward what does
18 research tell us and where do we need the market to be
19 in the long term, so we can balance those long-term
20 codes with color capabilities.

21 It's important to say we, the CEC, we will not
22 certify any products. We're not going to have a CEC
23 online list of compliant lamps.

24 The OV testing or the judgment of whether the
25 lamps meet this specification is going to be done by the

1 utilities, and George will talk about that later on.

2 Forwardly speaking, what we've done is we've
3 said this specification applies only to a narrow range
4 of lamps which are our primary focus in transforming the
5 majority of residential and small commercial market.
6 So, we're limited in terms of the lamp shapes, the lamp
7 bases, and the CECTs that are eligible under the
8 specification.

9 We're not touching efficacy. Like Michael said,
10 the details are whether it's a nine and a half watt, or
11 a 12 watt, or a 15 watt is not important to us. We care
12 that it's not a 65 watt.

13 So, what we've done is we've created a standard
14 which is Energy Star Plus. The testing requirements are
15 using test methods that are used in Energy Star, so the
16 idea is not to impose additional burdens on
17 manufacturers, where they have to do significant
18 additional testing to meet our specification.

19 Manufacturers should be able to submit the
20 document that they would otherwise submit to Energy
21 Star, and they should be able to give that to the
22 utilities to prove that their lamps meet the spec.

23 Where we go beyond Energy Star is just in a few
24 areas of performance with regarding to dimming, to the
25 photometric beam shape of the lamp, to color

1 consistency, to color rendering and to the lamp light
2 and warranty.

3 So here's our first take on which lamps we'd
4 like to see eligible for the specification. This matrix
5 shows the lamp shape along the columns, and the lamp
6 shape is things like, you know, is it an MR-16, is it an
7 area lamp? What's the shape of the glass envelope or
8 the reflector that constitutes the lamp.

9 The rows are what is the lamp base, so what it
10 is the socket, what does it insert into? And is it
11 working? And line voltage, is it working at low
12 voltage?

13 That in each one of these cells what we've put
14 in here is a photometric shape, the photometric output,
15 the beam shape that the lamp has to have to be eligible.

16 So, for instance, if we look at PAR 20s and PAR
17 30s, if you have a PAR 20 or 30 lamp with a screw base,
18 a line voltage screw base we're going to say that lamp
19 is only available -- is only going to meet the
20 specification if it has a spotlight type of a beam. So,
21 PAR 20 or 30 lamps with those bases that have only
22 directional light output would not be eligible for the
23 spec.

24 So, all of this is up for grabs. This is our
25 first take on what we think should be eligible.

1 And the intent here is to meet the expectation
2 that a consumer has, an uninformed consumer. So, if
3 they buy a lamp off the shelf and they want to replace
4 the incandescent they've got with an LED, that we're
5 saying is a good LED, that when they make that swap they
6 should be totally happy with what they did. They
7 shouldn't get anything unexpected. They shouldn't get a
8 weird appearance or a weird light output light shape.

9 So, one of the requirements when we go beyond
10 Energy Star is dimming. It's important to say that in
11 California the market for dimming is already pretty well
12 developed and is going to develop further in the future.
13 So, we have a new forthcoming Title 24 requirement for
14 dimming in nonresidential buildings.

15 For several years we've had dimming as a
16 compliance option in the residential code. And we
17 estimate now that about 30 percent of residential screw-
18 based sockets in California have a dimmer attached to
19 it. You know, it's not just a light switch, but a
20 dimmer.

21 So, there's actually a ready market for a lot of
22 dimming LEDs to go into. And dimming, of course, is
23 great because it's not just something that improves a
24 consumer's perception of the lamp because they can
25 control it and they like being able to control it, it

1 also saves us more energy. So, when they dim it down
2 below four it's working, it's drawing less power.

3 What we -- one of the problems that we have
4 here, though, is that we don't have a test for what is
5 dimming? We want the dimming to be free of flicker and
6 free of noise, but we don't have a test. Nobody has
7 developed a test, yet, to show or to quantify the amount
8 of flicker.

9 So, at this stage we think we've got a balance
10 here because it's the utilities that are going to be
11 judging the specification. So, even though we can't
12 write a tech or spec that says you must meet these line
13 items to be flicker free because the utilities are going
14 to be judging it, and they're basically going to be
15 judging it by eye and deciding for themselves where this
16 LED lamp is flicker-free down to ten percent.

17 So, it's a subjective test.

18 Now, then in terms of beam shape this, again, is
19 a department from Energy Star. Energy Star is intended
20 to set a higher performance specification for products
21 that already exist. So, everything that's out there in
22 the market should be able to meet the performance
23 requirements of Energy Star if the lamp is tweaked
24 properly.

25 We don't necessarily have that restriction. So,

1 in our draft specification what it says is "slow cone
2 type LEDs are not eligible." If you produce an LED lamp
3 it must have a directionality that closely resembles an
4 existing incandescent type.

5 So the way the consumer takes it home and they
6 put it in, they get something that they recognize.

7 So, under our specification we don't have a
8 semi-directional kind of a light distribution, it's only
9 directional or flood lamp, which is a new type we had to
10 define, or it's one of the spotlight distributions
11 available in Energy Star draft two.

12 So, we reviewed, we did a little kind of staff
13 analysis of the available beam shapes. We were
14 perfectly satisfied that the Energy Star definition of
15 an omnidirectional lamp very accurately nails the
16 difference between what looks like an omnidirectional
17 lamp and what does not look like an omnidirectional
18 lamp.

19 What this graph here shows is the dashed line is
20 a standard 65-watt old lamp, omnidirectional.

21 The solid lines are various kinds of LED. The
22 two solid lines that stick out from the rest are slow
23 tens, and the solid lines that pretty close follow the
24 65-watt A lamp are omnidirectional LEDs that are truly
25 omnidirectional.

1 So, the Energy Star requirement is that between
2 zero and 135 degrees elevation the relative intensity
3 should not change by more than 20 percent from its mean
4 value, so that this line has to be pretty flat from zero
5 to 135.

6 Outside of 135 the lamp still has to give sub-
7 light, and I've forgotten what the number is, but I
8 think it's ten percent of its output has to be given
9 above 135 degrees elevation.

10 There were a lot of LED omnidirectional lamps
11 that met that, so we were satisfied that the Energy Star
12 definition is accurately capturing that.

13 Then we looked at spotlights. spotlights are a
14 lot harder to quantify and I know that the Energy Star
15 team has found the same thing, it's difficult to
16 accurately define what the beam shape of the spotlight
17 should be and give people enough flexibility without
18 being too restrictive.

19 So, what we said is we would just go with what
20 Energy Star says. We won't try to second guess that one
21 and improve on it, but we'll just go with their best
22 estimate.

23 But what we also did is we defined, on the next
24 slide, a new beam shape, which is between the
25 omnidirectional and the spotlight. And the reason we

1 defined this is we want to have a really good BR30, 65-
2 watt kitchen down light replacement, because that's such
3 a big market. It's as big a market as the
4 omnidirectional CFL market.

5 So, we want to have a lamp that very closely
6 resembles that light, kitchen down light that people so
7 commonly have.

8 And we've come up with a draft photometric
9 specification for that which we believe separates LEDs
10 that look like kitchen down lights from those that don't
11 look like kitchen down lights.

12 And one of the elements here is it shouldn't --
13 the LED shouldn't have a sharp cutoff, because if you
14 put something in your home and then you walk underneath
15 it and it goes from bright and glaring to totally dark
16 that's not giving the right impression, that's not the
17 kind of light people want in their houses, so we've
18 tried to capture that here.

19 The next one. Color quality, this I really is a
20 tough one. Color quality encompasses both color
21 rendering index, which is the veracity with which the
22 light reproduces color. And it also encompasses color
23 consistency, which is if you put two lamps together in
24 the ceiling can you tell the difference between them in
25 terms of their color temperature, their coordinates on

1 the chromosity diagram?

2 There is some very good research on this. I
3 mean, of course, the research goes way back to MacAdam,
4 in the 30ths, doing photometric research on this.

5 But we have a recent from the Lighting Research
6 Center, in the middle bullet here, that observers can
7 distinguish a two-step MacAdam ellipse difference
8 between lamps that are placed adjacent to each other.

9 Let's say you've got a row of lights in your
10 kitchen and you're looking at the side by side, if
11 there's more than a two-step difference in color
12 consumers can see that. That's a really, really tight
13 color bin. That's way tighter than, I think, any
14 manufacturer currently builds to.

15 Then there's kind of a back opposition which is
16 instead of looking at the lamps directly, if you look at
17 the light projected on the wall, so you're looking at
18 two spots of light projected on the wall like a painting
19 or whatever, consumers can see a difference in color if
20 it's greater than four -- four ellipses, four steps.

21 So, that's a bit of a more relaxed requirement
22 to that.

23 So, based on that research the right answer to
24 be able to provide consumers with lamps that gives them
25 both consistent color quality and somewhere between two

1 and four ellipses, that's pretty tight.

2 Energy Star is currently seven ellipses
3 tolerance around the -- so, this is one of the areas
4 where the California specification is definitely
5 tighter.

6 So, the color requirement that we have in our
7 draft is that all the lamps, any lamp must comply with
8 this specification, all of the tested samples should be
9 within four steps of the locus. And also that within a
10 given model of lamp, all of the lamps of that model,
11 from that manufacturer, should be within two steps of
12 each other.

13 So, they can be off the locus, but they have to
14 be close to each other.

15 So, that's one of the things we want to discuss
16 this afternoon is how realistic that is to require that
17 for right now.

18 This is just a diagram for those people who are
19 not -- who haven't read, you know, the fundamental
20 literature of lighting. This is an excerpt from
21 chromosity diagram, and a chromosity diagrams is a
22 two-dimensional representation of all the possible
23 colors of light.

24 This is the middle section, this is the whites,
25 all the colors around the outside.

1 This is the planckian locus, the curved line is
2 the planckian locus which is, if you take a piece of
3 tungsten and heat it up aggressively, these are the
4 colors that it changes through, from 2,500 and heats it
5 up to higher and higher temperatures.

6 The square bins here are the Energy Star bins,
7 seven-step MacAdam Ellipses, which means if you produce
8 a bunch of LEDs they're all going to be -- they're all
9 going to fall within one because they all join together.
10 So, every LED that's produced is going to fall within
11 one of them.

12 This is an important change and what we're
13 asking for is those bins are tightened, and not every
14 LED that's made will fall into the right bin.

15 Oh, and one other thing that we -- in our draft
16 we're limiting the available color temperatures or the
17 eligible color temperatures to 2,700 kelvin and 3,000
18 kelvin. and this is all part of this reasoning that
19 what you want to give consumers is a product that will
20 be near as down exactly the same as what they already
21 have.

22 If we -- there are 4,000 K, and 5,000 K and six
23 and a half thousand K lamps on the market right now.
24 There is a somewhat developed market for those as CFLs.
25 It's a question that we want your input on, is to what

1 extent should higher color temperature lamps be eligible
2 for this spec.

3 And then we move on to life. Lamp life is
4 another thing that we have not very much research on.
5 There have been a few studies. The problem is that the
6 few studies, the results of those few studies do not
7 align with the anecdotes that we hear.

8 To the anecdotes that I think everybody in the
9 light industry hears are there are a lot of unexpected
10 early failures from CLFs. But we don't have any test
11 results that show early failures from CFLs. All the
12 test results we have show steady decline at a time, with
13 a few outlying lamps that fail.

14 So, as far as I know we don't have any tests,
15 we've not developed a test, we've not developed an
16 elevated life test that successfully captures that
17 failure.

18 So, we don't have a test that shows, you know,
19 poor power quality kills CFLs, or temperature kills
20 CFLs, we don't really know.

21 And, of course, the electronics -- or the LEDs,
22 it's all electronic, it's all capacitors, and resistors
23 and ICs, it's the same stuff. So, if we don't
24 understand the reasons why CLF fails, we don't really
25 understand the reasons why LEDs fail.

1 I've heard from Energy Star that they've got
2 some initial results of elevated temperature tests that
3 do show some failures and that's good news but,
4 basically, so far we don't understand it.

5 So, our approach to this has been to say given
6 that we expect that life may be a problem -- you know,
7 it may not and if it's not, that's great.

8 But if life is a problem, what we want to do is
9 provide consumers with a warranty so that they have the
10 certainty that if they buy -- you know, if they spend a
11 bunch of bucks on LED lamps, that if any of those lamps
12 fail they can take them back to Home Depot, or wherever
13 they got them from, and they can get them replaced for
14 free.

15 Oh, so my colleague, Gabe Turner, is going to
16 say a few words here.

17 MR. TURNER: I just wanted to say a few words
18 about Title 20 and emphasize, again, a number of people
19 have said this already, but this is not a mandatory
20 specification. And this is relatively unrelated to our
21 current open proceeding under Title 20.

22 We are looking at 16 different technical areas,
23 different appliances in our current appliance proceeding
24 and one of those is lighting -- one of those lighting
25 topics is LED lighting.

1 But that is something that we're planning on
2 releasing a request for information in the next couple
3 of months and we're planning on moving forward with that
4 over the next couple of years. And it is unrelated,
5 essentially, to this topic here.

6 We're working here to try to protect the market,
7 to try to move the ball forward as far as consumers'
8 appreciation for this technology.

9 Under Title 20 we will look at what is
10 technically feasible, what is cost effective, we will
11 look at all the normal things that we look at under
12 Title 20 and that is still a few years out.

13 So, I just wanted to emphasize that once again.

14 And one point, just our current thinking and
15 this is unresolved as of yet, but my current thinking
16 right now is that the Title 20 regulation will be a
17 mandatory floor standard. So, it will provide something
18 that's below Energy Star that says that anything that is
19 this bad cannot be sold in California.

20 But Energy Star and the voluntary specification,
21 any utility programs, all of that will be separate and
22 will be above that Title 20 specification.

23 So, that's about it.

24 MR. HOWLETT: Okay, so as Gary said earlier on,
25 we're not taking questions right now, except for

1 clarifying questions. So, if you have any those, please
2 let us know.

3 And next up is Michael McGaraghan from Energy
4 Solutions, who's going to take us through some
5 comparisons between the California spec and what else is
6 out there in terms of Energy Star and other
7 specifications.

8 MR. MC GARAGHAN: Okay, thanks Owen. Again, my
9 name's Mike McGaraghan, I work for Energy Solutions.
10 I've been doing a number of things on LED quality
11 lighting on behalf of PG&E, so I'm very excited to be
12 here and have this opportunity to participate in today's
13 presentation.

14 So, one of the things I've been doing is helping
15 out with the Energy Commission staff as they develop
16 this voluntary specification proposal.

17 So, I just have a few slides to go through in a
18 couple of minutes. One of the main things I want to
19 cover today is just a sort of side-by-side comparison of
20 Energy Star, where they've been, where they're going and
21 the proposed California Voluntary Quality Spec.

22 And then the next few minutes I was going to run
23 through kind of a snapshot of LED products over the last
24 few years and how they've been improving in each of
25 these key metrics, so we can see kind of how they

1 compare to the spec.

2 So, I'm sure this -- most of you know this like
3 the back of your hand, but just to get on the same page
4 of where Energy Star's at, the current Energy Star
5 specification is called Integral LED Lamp spec,
6 effective since 2009 and it's been updated four times.

7 But there's a new specification under
8 development that's called the Energy Star Lamps spec.
9 Right now they're working on Version 1.0, they had
10 started that in 2011. They've had two drafts come out
11 and so the latest draft we're on is draft two, and it
12 looks like it will probably be adopted in 2013.

13 The most notable thing about that spec is that
14 it's combining CFL and LEDs into one specification,
15 which is -- has implications for the actual levels. In
16 a lot of cases Energy Star's tied to both one level on
17 all lamps. In some cases they've kept it separately.

18 So, when the CEC talks about the spec being an
19 Energy Star Plus approach, what they're really talking
20 about is this most recent Energy Star proposed
21 specification, which is Version 1 and draft 2.

22 Energy Star is a really broad specification.
23 It's hugely valuable in that regard. It covers probably
24 -- there's probably five or ten that I left out, but
25 everything from efficacy to toxic reductions and

1 luminous intensity distribution. It covers a wide
2 variety of developments.

3 So, the next slide here, we'll stay on this for
4 a minute, this is just side-by-side the Energy Star
5 version one, draft two, and the proposed California
6 Quality Voluntary spec.

7 As Owen just explained earlier, there's a few
8 key differences, I guess it's seven, really, where the
9 California Quality spec is proposing to go above and
10 beyond what Energy Star is doing.

11 So, they are: lumen maintenance -- that one is a
12 little bit uncertain. This draft one of Energy Star
13 said 10,000 hours, it was actually sort of stepped back
14 for LEDs.

15 Draft two, they kicked it back up to 25,000
16 hours and we're not sure where they're going to end up.

17 The California spec is very rigid, it wants to
18 stay at 25,000, so that may or may not be a difference
19 with the final Energy Star spec.

20 Warranty, there is a difference there. Energy
21 Star is saying two or three years, it depends on what
22 the life is. California's saying five years, possibly.

23 The next major difference is dimmability. Of
24 course, Energy Star does not require lamps to be
25 dimmable. It has requirements or is going to have

1 requirements for lamps that are dimmable. But
2 California's proposing that all lamps should be dimmable
3 down to 10 percent, as Owen mentioned, flicker and noise
4 free, and we do believe there are some compatibility
5 specs there, too.

6 The next major difference side-by-side is color
7 rendering. Energy Star is 80 CRI and an R9 above zero.
8 California is going CRI 90 and R9 above zero.

9 The next major difference, color appearance,
10 Energy Star allows - a lamp to be in any of these color
11 bins, 27 through 6000 -- while California is focusing on
12 only 2700 and 3000 Kelvin lamps.

13 Also, the consistency of the bins as Michael
14 explained earlier. Energy Star is sticking with color
15 bins sizes at 7 MacAdam steps while California is
16 proposing to drop that down to 4 MacAdam steps.

17 The next one here is very related to that, but
18 it is color consistency within a specific model. So, if
19 you buy several lamps from one manufacturer of the same
20 model, Energy Star doesn't have any additional
21 requirements for how closely those lamps need to be --
22 their color needs to be to each other.

23 California is proposing a two-step consistency
24 among lamps of a given model number. So, that goes back
25 to Michael's presentation earlier.

1 The next item is not a customer quality issue,
2 as much as a power quality issue for the utilities.
3 California is proposing to push farther on the power
4 factor.

5 (Off-record conversation)

6 MR. MC GARAGHAN: Wow, that's much louder now.
7 Apologies to those on the phone. Don't think I have
8 time to redo that, so I'm going to plow ahead.

9 The last key difference side-by-side there is
10 just the directionality. But Energy Star allows lamps
11 called semi-directional or non-standard lamps. In many
12 cases those are lamps that only project light upwards
13 from the -- away from the base.

14 So, as Owen explained, California is being very
15 specific in terms of what a non-directional lamp is and
16 a directional lamp meaning flood or spot.

17 Are there any questions on this sort of side-by-
18 side comparison before I move on? Am I okay to move on?

19 Okay, the next series of graphs I'm going to run
20 through pretty quickly, but I'll explain kind of what
21 they are.

22 Our team has been tracking LED lamp performance
23 over the last several years in the Lighting Facts
24 database and the Energy Star database. And every two,
25 three, four, five months we pull a sample of the product

1 lists and we've noted the highest performance product,
2 the average value, and the lowest performing product
3 added to the list in that period of time.

4 So, here's the first one, it's just a glimpse of
5 efficacy over time. And California's not proposing to
6 go beyond Energy Star in terms of efficacy.

7 So, here is the CEC's proposed levels, which are
8 the same as Energy Star, it depends on your wattage, but
9 either 55 or 60 for an omnidirectional lamp.

10 The blue dots represent the best values in the
11 Lighting Facts database, orange is average, green are
12 the lowest values, and you can see how it's trending
13 over time.

14 So, you know, this line right here represents
15 all of the products that were added to the database
16 since we checked it here.

17 So, the trend lines kind of project out a couple
18 of years. You can see that even the average values are
19 already above CEC's proposals. So, CEC's proposals are
20 not aggressive in terms of efficacy. The efficacy is
21 increasing very quickly on its own.

22 The same story here for PAR lamps, the average
23 values have been above the CEC-proposal, already, for a
24 couple of years.

25 MR. FEIT: Are those at 90 CRI or are those at

1 80 or less?

2 MR. MC GARAGHAN: This is the entire Lighting
3 Facts database.

4 MR. FEIT: So that's basically less than 90, so
5 your efficacy is basically 20 percent higher than it
6 would be with a 90 CRI.

7 MR. MC GARAGHAN: Well, some of these products
8 would have high efficacy and high CRI.

9 MR. FEIT: Very few, right?

10 MR. MC GARAGHAN: A few of them, yeah. But,
11 yeah, you're right, this is isolating one parameter at a
12 time.

13 (Off-record conversation and interruption)

14 MR. MC GARAGHAN: Great, thank you. Yeah,
15 that's great. Okay, the next slide here is looking at
16 CRI, looking at the Lighting Facts database from January
17 2010 through just last month or maybe even last week.

18 The highest CRI values started creeping above 90
19 already a year ago, the average values are creeping up,
20 the low values are creeping up.

21 There are 20 omnidirectional lamps in the
22 Lighting Facts database right now with a CRI over 90.

23 And looking at PAR lamps, they're doing better.
24 their best values have been above 90 since January of
25 2010. The worst values are not improving over time, it

1 appears.

2 So, for those of you online who missed this,
3 apologies for the technical difficulties. But what
4 we're doing is just taking a look at product performance
5 over time for the last few years.

6 So, each vertical row of data points represents
7 products added to the qualifying product list or the
8 Lighting Facts database since the previous set of data
9 points.

10 So, just you can see here that the CEC-proposed
11 levels are not nearly as high as what the best products
12 are already achieving.

13 So, CRI is the one we just covered.

14 Here's just a look at dimmability and this is
15 moving, now, to the Energy Star-qualified product list.
16 Omnidirectional lamps 65 percent, almost 30 lamps, are
17 dimmable, 35 percent are not dimmable.

18 And in directional lamps the trend is even
19 stronger that most lamps at this point are being made
20 dimmable at 83 percent.

21 Just a look at lumen maintenance, not a lot
22 changing here over time in terms of the best values and
23 the low values, so this is the Energy Star list. The
24 average values are getting lower over the last few
25 years.

1 But the minimum value, obviously, for Energy
2 Star 25,000 every period, except for one, there's been a
3 product added at 50,000.

4 So, generally, lots of products well up above
5 the 25,000 L70 value for lumen maintenance.

6 Here's just a sort of snapshot of product
7 warranties from the Energy Star Qualified Product List.
8 You see a number of products coming in at three years, a
9 number of products at five or six and, occasionally, one
10 at ten.

11 So, again, the CEC-proposed level is showing
12 there at five, lots of products at five or above.

13 And I think this is the last one, power factor
14 over time. Again, CEC's proposed level is .9. You see
15 in both cases, for omnidirectional lamps and directional
16 lamps a large quantity of lamps that are already being
17 made above .9. It's hard to draw a trend out of a
18 dataset like that, but the trend is moving upwards for
19 that one, too.

20 And that was that, so are there any questions on
21 any of those slides before I turn it over to the next
22 presenter or to the MC? Okay.

23 MR. FLAMM: So, George, are you here?

24 So, our next presenter is George from the
25 California Public Utility Commission.

1 MR. TAGNIPES: Hello. Hi, my name is Jeorge
2 Tagnipes, I'm with the California Public Utilities
3 Commission. I want to thank the Commissioners and the
4 CEC staff for inviting me.

5 Today I'm here to talk about the CPUC's role in
6 this standard. So, in Decision 1205015 -- I didn't
7 bring slides so that's why there's a -- I'm just going
8 to talk briefly on this.

9 Decision 1205015, the Commission issued guidance
10 to the utility programs. They said for your '13-'14
11 programs you can offer rebates for LEDs that meet the
12 CEC's quality specification, it's called Standard
13 Variable Specification.

14 And this is for the '13-'14 cycle. The programs
15 were trying to scale back things that weren't working,
16 but then scale up things that are working to make the
17 way for the post-2014 programs.

18 After that the utilities submitted applications
19 and now it's up to the Commission to make a decision on
20 what kind of programs can be adopted.

21 Just this week the proposed decision was issued
22 and the additional, I guess, clarification that ties
23 into the discussion today was that the Commission
24 recognized that if the specification is not adopted
25 there may be a gap between what can be offered.

1 So the Commission in that addition said in
2 advance of the specification being adopted, the
3 utilities can offer LEDs within a certain level of
4 quality after discussing with the CEC.

5 So, if you didn't know that, that's what's in
6 the decision right now and it's before the Commission
7 for, I think, a November time frame.

8 In the dicta of the original guidance decision,
9 Decision 1205015, the Commission said that these LEDs
10 would be an upstream durable mechanism, as well as a
11 mid-stream durable mechanism.

12 And also clarified that this would probably be
13 mainly a residential program, but to the extent that
14 these programs also offer these LEDs to the commercial
15 sector, that's also relevant.

16 And what Owen brought up, there's probably also
17 small commercial applications for these kind of rebates,
18 for these kind of measures.

19 All of these are in support of the California
20 Long-Term Energy Efficiency Strategic Plan, especially
21 the lighting chapter, to push more advanced bulbs out
22 there and to meet the goals that Michael was talking
23 about earlier, but also the 60 to 80 percent reduction
24 in lighting consumption there, in the strategic plan.

25 The one thing that wasn't mentioned, that we'd

1 have to consider, that wasn't in the specification and
2 isn't any kind of Commission decision is what happens
3 when the specification is adopted and how to understand
4 which bulbs the utilities can offer.

5 And I think Owen brought this up, that would be
6 up to the utilities to determine or figure out what kind
7 of bulbs they can offer through their programs.

8 And once the Commission adopts their decision on
9 the kind of programs for '13-'14 and once the
10 specification is adopted, the Energy Division will work
11 with the utilities to determine the kind of bulbs that
12 will be offered through this program.

13 And I'm here to throw out support in saying
14 that's what Energy Division will commit to do going
15 forward, after all these things are adopted,
16 specification and decision.

17 That's all I have.

18 MR. FLAMM: So, are you going to be around
19 later, George?

20 MR. TAGNIPES: I will.

21 MR. FLAMM: Okay, so when we have the QA, thank
22 you.

23 Okay, I'd like to introduce our next speaker,
24 Terry McGowen. He's a principle of his own lighting
25 consulting business. He also is acting on behalf of the

1 American Lighting Association as the Director of
2 Engineering.

3 He's a Fellow with the Illuminating Engineering
4 Society, the 2009 recipient of the IES medal award in
5 recognition of his work as a lighting educator,
6 researcher and author.

7 Terry serves on several UL and CSA standard
8 technical panels, as well as committees of the IES and
9 the CIE, that's the Commission Internationale
10 d'Eclairage. Excuse me for destroying the French, for
11 those who might speak French. That's the International
12 Lighting Commission.

13 He's had 50 years -- he's only 40 years old, I
14 don't know how he has 50 years' -- experience with GE,
15 in Cleveland, where he retired in 1998. And I don't
16 think Terry's really retired because I work with him all
17 the time.

18 MR. MC GOWEN: Well, thanks Gary and thank you
19 for the opportunity, Commissioners, to be a part of this
20 program.

21 I am here on behalf of the American Lighting
22 Association, which is the trade association for
23 residential lighting. It serves both in the U.S., and
24 Canada, and the Caribbean as that trade association, and
25 our members are made up of lighting fixture

1 manufacturers, lamp manufacturers, interior and lighting
2 designers, component suppliers.

3 It's kind of a vertically integrated
4 organization, so we go from raw materials to retail
5 products. And it's a little different than most trade
6 associations because it does include the sellers of both
7 lamps and lighting fixtures.

8 So, I believe we know a lot about the
9 residential lighting industry and, best of all, in
10 support of this program, we know a lot about the
11 consumers. We know what they want, we listen to them
12 very carefully, we educate our members to listen to them
13 carefully, and I hope we can bring a lot to this
14 program. That's our intention and we have, of course,
15 worked with the Commission and its residential lighting
16 efforts for some time.

17 What I'd like to talk about is color and do that
18 in the context of something called lighting quality. In
19 our view, residential lighting quality is really at the
20 heart of the matter of what we're discussing here with
21 this proposed LED light source.

22 We understand there are billions of sockets out
23 there, most in residences that continue to use
24 incandescent bulbs. And this may be a little bit of an
25 overkill, but this is kind of traditional. You've seen

1 rooms like this. You've lived in rooms like this. You
2 have gone into rooms like this and seen all of the lamps
3 on all day, into the evening, and maybe a few on all
4 night, too.

5 So, this is where much of what the U.S. and
6 Canada do in terms of residential lighting.

7 But in terms of quality residential lighting it
8 can run the gamut, it can look like that. It can look
9 like that. It can look like this and it can look like
10 this.

11 And it can look a lot of what you see every day
12 because it is subjective, it is personal. The home is a
13 very personal space and we treat it accordingly in our
14 culture. And what we try to do in the residential
15 lighting industry is give the consumer what they want to
16 make their home look and feel like what they want it to
17 be. That's our job and we're very good at it.

18 As far as I know, and I don't know of any
19 studies, but I think probably our members have more than
20 half of the lighting fixture sales that are sold.

21 And I would caution you that when you think of
22 lighting fixtures and lamps, I've noticed a tendency
23 that people tend to think of big box stores. It may be
24 true of lamps to some extent, but it's not true of
25 lighting fixtures.

1 Most of the lighting fixtures go through
2 companies, who may not be our members, but are very like
3 our members in the sense that they have lighting
4 showrooms, they may have furniture stores, they may have
5 other retail outlets.

6 But they're not big box stores, they are stores
7 which cater to the individual needs and wants of
8 consumers who go into a store and say, ah, I like the
9 look of that, I want to take it home.

10 So, there is more personalization here than
11 perhaps we have been thinking about for a long time.

12 The factors that we see that make up lighting
13 quality are very much like the list that you've seen
14 already, but I'm going to state them a little bit
15 differently.

16 And you can see them here, absence of glare,
17 layers of light. And by that I mean you go into a room
18 and there isn't one light bulb in the center of the
19 ceiling. There used to be, but not anymore, because we
20 find, well, that doesn't work for everything we want to
21 do in the room, and so we put a table lamp here, or a
22 floor lamp over there, a task lamp on the desk and get
23 the result for the room as a whole and put the people in
24 that room that we want.

25 I'm going to talk mostly about color here and

1 that shows up high on the list. And as you've already
2 heard, it tends to mimic incandescent lamps with a low
3 chromaticity, 2700 to 3000 kelvins, high color
4 rendering, coloring rendering index of 100, and minimal
5 color shift over time, and lamp to lamp.

6 No visible flicker. Flicker is one of those
7 very strange things, you're right to be considering it.
8 What we've found, however, it's a little different than
9 you're looking at it. Flicker sensitivity applies to
10 about 10 percent of the population, as near as we can
11 tell.

12 If you're sensitive to flicker, it will
13 absolutely drive you crazy if it's there. If you're not
14 sensitive to flicker, you walk around saying I don't see
15 it, I don't care.

16 So, you have to watch out for that 10 percent
17 because often they're noisy, and they will let you know
18 about that, and it won't be nice from a lighting system
19 stand point.

20 Optical control, light where we need it,
21 patterns and shadows as expected, electrical control,
22 dimming and modulation of light as required, and
23 sufficient light for the task, and age of the user.

24 And let me point out, one of the most important
25 things we're doing right now is talking about how do we

1 change lighting fixtures and lighting for the elderly?

2 I mean these are 10,000 people a day in the
3 U.S., in what the Canadians call a silver tsunami,
4 bearing down on us, that I better change the way we do
5 lighting. And they're already making a difference in
6 what we do and how we do it.

7 So, that's something that we're building into
8 our products and we have to take it into account in
9 programs like this as well.

10 Okay, I wish the bad dream of compact
11 fluorescents hadn't happened. It didn't do residential
12 lighting any good and we'll be cleaning up the mess for
13 a long time.

14 But I think, as Owen said, we had a chance to do
15 it better with LEDs.

16 And so what I would suggest is this, recognize
17 that the rules of good lighting have not been suspended.
18 The quality of light does matter and consumers define
19 that for themselves, especially in their own homes. And
20 so they're individual about how that looks.

21 On the top of the list that we see, always, is
22 color. It matters the most because it's the most
23 visible to most people.

24 This is what they notice. If you see the
25 comparisons, like Michael showed you, side-by-side

1 comparisons, one lighting fixture versus another, color
2 is going to show up. It always shows up and it always
3 shows up first on people's list.

4 Again, I don't have scientific studies about
5 that, but I know what the retail sales people in
6 lighting showrooms say again, and again, and again, we
7 can't sell CFLs, or we can't sell this thing because
8 people don't like the look of a light, or the color of
9 the light. And I've heard that so often, now, over this
10 era of CFLs that we have been going through.

11 So, how do we move toward more efficient
12 lighting within this structure? Well, our idea is this,
13 and now I'm going to go in a little different way than
14 what you've heard so far.

15 What I'm going to do is compare the spectral
16 distributions of an incandescent lamp and an LED lamp.
17 This is what I call raw data when it comes to color.

18 We have metrics, as you've already heard,
19 chromaticity and color rendering for color, but these
20 are models. They're not the raw data.

21 So, if you look at the raw data that comes out
22 of a light source and it says for an incandescent source
23 you've got mostly red, orange and yellow, lesser amounts
24 of green and a relatively low amount of blue.

25 But there are a couple of things that seem to be

1 important. One is this is a continuous spectrum all the
2 way from the deep red to the deep blue there are no
3 gaps. Why is that important? Because if you've got an
4 object and there's a gap in here, and you've got an
5 object that wants to reflect that color, it's not going
6 to look right. It's going to look different, or odd, or
7 peculiar because there's something missing.

8 So, whenever you have a spectrum that isn't
9 continuous, you're going to have problems with color
10 rendering and appearance of people and things that may
11 or may not be important or serious, but they will be
12 there.

13 And so when the fluorescent lamp came along and
14 now, of course, the LED light source, one of the best
15 things that happened was we didn't just take the LED
16 spectra, which are line spectra, but we added
17 phosphorous to smooth out, to broaden and to improve the
18 color rendering characteristics of the product. Without
19 that we would be in much more color difficulties than we
20 are today.

21 But as you see, if this is our model and we have
22 more than 100 years of experience, it's built into our
23 culture now, so it really has to be, and we say we'd
24 like to put this in place of that, then we already have
25 to say it's going to be different and what can we do to

1 minimize those differences and make them more acceptable
2 to people.

3 Well, one is chromaticity and that's relatively
4 easy to fix because that tells you what does the light
5 source look like as you look at it, or you look at what
6 it does on neutral surfaces, such as white surfaces that
7 we have here.

8 That's relatively easy to fix with any light
9 source, particularly those that use phosphor, or LEDs,
10 or gas discharges.

11 So, that's really something that we know a lot
12 about with respect to incandescent because incandescent
13 has not changed much over the years, it's always been
14 down in the 2700 to 3000 area.

15 Color rendering index is a little odder because
16 that's a constructive model, built back in the 1960s,
17 and it does sort of a good job of telling you where you
18 are, but I sure wouldn't put any decimal points after
19 those numbers because you don't see those. You don't
20 see three to five points of difference here. It's an
21 approximation. It's an indicator of color rendering.

22 And, yes, incandescent by definition is 100, and
23 82 would mean, well, that's only 80 percent or so, as
24 good as an incandescent, if you wanted to think of it
25 that way in terms of quality.

1 So, yeah, it should be up there better, but I
2 couldn't give you a number that says it should be 90, or
3 93, or 93 because you couldn't see the difference and
4 I'm not sure that, really, anyone could in terms of a
5 marketing program, see those differences, either.

6 But it should be higher, obviously, because the
7 higher it is the more light incandescent it will be and
8 that really is what the story is all about.

9 So, we would love to see 100 but, yeah, I think
10 we can cut back on that a little bit, and talk about it,
11 and come up with something that makes sense.

12 Now, we've looked at LEDs in the ALA, and we did
13 something starting ten years ago, now, we joined up with
14 some partners and put together a lighting fixture design
15 competition, called Lighting For Tomorrow.

16 So, we now have ten years' of experience with
17 energy-efficient lighting fixtures and light sources,
18 starting with CFLs, and since 2006 involving LEDs.

19 Each year we judge and we have a panel of judges
20 that include technology people, as well as people from
21 lighting showrooms, no manufacturers, lighting designers
22 and others who understand not only the technology, but
23 the design and application of these for lighting
24 environments.

25 We put them in a room for two days. We have

1 partners who are underwriters, laboratories, and the
2 Consortium for Energy Efficiency, we three work together
3 on this, and we put together a catalogue of winners,
4 these are the best of the best.

5 And we have gone from judging just luminaires to
6 the past few years of judging luminaires, plus retrofit
7 kits, these would be the kits that go up into existing
8 fixtures, like a down light, replacement lamps, the kind
9 of products we're talking about here, and now for the
10 past two years lighting controls.

11 So, we're trying to get this whole package of
12 energy saving -- potentially energy-saving products
13 together and show people what's out there that really
14 works, and most of all is salable. If it isn't sold, it
15 isn't going to save any energy, that's the idea.

16 So, we push this into the retail stream and out
17 the doors, and with the help of the Consortia for Energy
18 Efficiency members, some 130 electric utilities, energy
19 offices, and so forth who work on programs for rebates,
20 we move those out to the consumer level.

21 And so this has worked but, most of all from my
22 stand point, it has given us a feedback system that
23 tells us what the consumer is thinking about and what
24 they're doing with respect to energy-efficient products
25 that goes far beyond what we could learn any other way.

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1 So, what we're saying here is that we support
2 your effort to put onto the market, into the marketplace
3 as a voluntary product that has high quality of light,
4 especially color, higher than what we see routinely
5 anywhere else.

6 We think that removes a major barrier of
7 acceptance for LED lighting products and it's certainly
8 within the present LED technology, and it is a very good
9 thing to do at this particular time because of the
10 quality requirements that we see in the residential
11 lighting market.

12 And I'll add one final thing, we have been
13 through this before, we have tried to do this. Nobody
14 in this room, probably, was personally involved, but we
15 can now, with some of the revisionist history,
16 particularly with the early days of electric lighting,
17 we can feel for these people and what they were going
18 through.

19 On December 31st, 1879, as Thomas Edison,
20 standing in the door there, managed to get hundreds of
21 people to brave the train and the snow-covered fields of
22 Menlo Park, New Jersey to come out and see his first
23 electric lighted house and grounds, he was beginning
24 what we have gone through with CFLs and LEDs, trying to
25 get a new light source accepted by people to use in

1 their homes.

2 He was not particularly successful because by
3 1884 he had resorted to things like this, the Great
4 Edison Torchlight Parade in New York City, on a gloomy
5 night where he harnessed a steam engine to an electric
6 generator, pulled by a team of horses, and wired up to a
7 couple of hundred people with helmets and light bulbs on
8 their heads, walking down the street to call attention
9 to this marvelous new device.

10 Can you imagine that scene?

11 We want you to know about electric lamps and
12 what they can do for you was the message, and it must
13 have been a magnificent setting, but I don't think it
14 sold many light bulbs.

15 Instead it took this, the Columbian Exposition
16 in Chicago of 1883 to impress consumers, potential
17 consumers about what electric illumination could do.
18 The glitter, the sparkle, the show, the drama, the
19 excitement, all of this went together.

20 Unfortunately, this was a Westinghouse
21 competitor of Edison's and that rivalry went on for a
22 long time. There are wonderful stories there.

23 But what it spawned was this industry that we're
24 trying to change, now, and the consumers that buy the
25 products from it.

1 Because looking at the showrooms for those
2 products is very much like looking at showrooms of
3 today. These products came from gas lighting fixtures
4 that were in homes, they were familiar to people, they
5 were in the culture, they understood the culture, and it
6 was a transition that made sense because it wasn't a
7 dramatic transition in appearance, it was an
8 improvement, it was a cleaner way, it was a cooler way,
9 it was a more efficient way, it was a way that kept the
10 familiar that people liked, but moved the technology
11 ahead to a more efficient, more economical choice of
12 power, as well as higher quality of illumination.

13 That's the kind of thing I think we have to do
14 today and color is, of course, one of those things.

15 So, as we go from this, to this, to wherever we
16 want to go with LEDs, I think we have to say, you know,
17 the looks of this are not going to change all that much,
18 but the tool that we have, if we do it carefully, is
19 going to change quite a bit assuming we understand that
20 this is part of our culture and will be maintained by
21 the consumer in a very stubborn way.

22 Thank you.

23 MR. FLAMM: Thank you, Terry.

24 So, I'll introduce our next presenter, Lorne
25 Whitehead. He's a Professor of Physics and Astronomy

1 and a 3M Chair in Applied Physics at the University of
2 British Columbia. He has a PhD in applied optics from
3 UBC and is also a profession engineer.

4 He's currently on the Board of Administration of
5 the Commission Internationale d'Eclairage. He's an
6 expert on color rendering index standards and he's an
7 established expert on color theory.

8 So, Lorne.

9 MR. WHITEHEAD: Thanks Gary. Well, thank you
10 very much, it's an honor to be here, Commissioners, and
11 it's an honor to follow my hero, Terry McGowen; a
12 wonderful presentation.

13 I've only been asked to speak for ten minutes
14 and I could speak all day about color rendering. So,
15 I'm going to make, really, just a few, I think, fairly
16 straight forward points, keep it simple. But, also,
17 I'll try to be direct because this is an important issue
18 that needs some frank and direct conversation.

19 So, here's a brief outline of my talk. I'll
20 give a background comment about where I'm coming from on
21 this. I will be arguing mainly about CRI, so I'm going
22 to focus on CRI. The argument I'll make is that CRI
23 greater than 90 is a really good idea. CRI of 80 is
24 problematic. And by the word "problematic" I mean bad.
25 And I will say that more clearly.

1 (Laughter)

2 MR. WHITEHEAD: Now, I'm also going to argue
3 that the opposing views that we hear, and there are
4 opposing views, are incomplete. And by incomplete, I
5 mean wrong, and I'll explain why I feel that way.

6 (Laughter)

7 MR. WHITEHEAD: And I'll conclude simply by
8 saying CRI of 90 can save energy and can be really good
9 for people, which is what this is all about.

10 So, first of all, my background, so I am a
11 physicist by training.

12 The work that I do these days is both in physics
13 and in psychology, and so I work with a number of expert
14 psychologists who are trained in that discipline. And
15 it's all to do with light, the impact of light on
16 people.

17 So, I really can confidently say I understand
18 that field. And it's a hard field, it's a
19 mathematically complicated field. So, if you aren't an
20 expert in it, which almost everybody isn't, you just
21 need to talk to the people who are. And they're nice
22 people, they like to talk and they're good to work with.

23 And the other bring here as well, though, that
24 I'd like to stress, is that half of my career has been
25 in the private sector, in business and manufacturing,

1 both founding companies and leading companies, and
2 working with major manufacturers.

3 So, I really believe that I do understand the
4 basic economic issues here. And, you know, you need --
5 in my opinion, you need to get the advice of people that
6 understand all of these issues. Terry, of course, is an
7 excellent example of that, and Michael Siminovitch as
8 well. These are the people that know this stuff, and
9 there are a lot of them out there, but there are many
10 that don't have that combination. So, that's a personal
11 view of where you'll get the best advice.

12 I also should say I have no vested interest in
13 this. I'm here visiting from the University of British
14 Columbia for just one reason, the public good. I'm a
15 professor, I'm also a professional engineer and it's my
16 duty to be here and give presentations like I'm giving.

17 And I'd really to call, in that regard, or
18 emphasize in that regard the need to uphold what I would
19 call scientific standards of debate.

20 And what I mean by that is any field like this
21 it's often to hear -- it's common to hear opinions
22 stated, and everyone is welcome to their opinions, but
23 there is a higher level of decision making where people
24 that understand the science clearly debate in scientific
25 terms, and with evidence, and data, and research to

1 support their views and collectively come to a
2 consensus.

3 And I'm thrilled to see that happening here
4 today and I would just like to say how strongly I uphold
5 that.

6 And it actually is maybe a bit of advice to
7 Commissioners, as they listen to conflicting views, is
8 just to look at the background of the people stating the
9 opinions and maybe, just as importantly, look at how
10 they defend those opinions.

11 If they defend those opinions by citing their
12 sources and using normal reasoning techniques, it's more
13 likely to be valuable information.

14 So, I'll give you a couple of examples here and
15 it's going to sound like I'm ranting. I'm not, but you
16 will hear these kinds of quotes. So, here's a quote,
17 "ordinary people simply don't want or need a CRI of more
18 than 80."

19 This is a real quote from an executive in a
20 major lighting company. And this person meant this
21 strongly. But it turned out this person actually didn't
22 know what CRI was. In the conversation, what I learned
23 is that there really was a fundamental misunderstanding
24 there and it was easily corrected.

25 So, not everybody who has a strong view about

1 CRI necessarily, you know, has a clear view about CRI.

2 Now, here's one from within the Department of
3 Energy, "we have an energy crisis, we just can't afford
4 a CRI in excess of 80."

5 Well, how do you deal with that? It sounds kind
6 of unpatriotic with that kind of rhetoric to even
7 imagine that we'd need a CRI of more than 80.

8 But it's actually completely false, and if it's
9 one point I'll leave you with today is that a CRI of 90
10 doesn't mean wasting energy.

11 And we've already heard today the idea or the
12 fear, the worry, which is understandable, that it might,
13 because it is true that a CRI of 90 means a slightly
14 lower number, a number called efficacy. And it's a
15 false, but common confusion to think that a slightly
16 lower efficacy in this situation would waste energy. It
17 simply isn't true and I'll explain that a little more.

18 So, now, color rendering, Terry gave an
19 interesting, an excellent, brief introduction to color
20 rendering, and I'm going to give one that's shorter and
21 less accurate, but captures the gist. And what I will
22 say is that everything I'm about to say in this over-
23 simplification I can justify very carefully and in full,
24 and I'd be happy to do that in any situation where I was
25 given more time.

1 So, here's the short version, in nature, as
2 Terry said, spectra are kind of smooth. They can have
3 different shapes, but spectral distributions are fairly
4 smooth. And what they produce, by definition, is
5 natural pure colors.

6 And we were lucky with Edison that he invented a
7 light source that also, luckily, produces those colors.
8 So it just so happens we got lucky that time.

9 We did not get lucky with fluorescent lamps. We
10 can get lucky with LEDs, but only if we do the right
11 thing and that's what today is about.

12 So, that's the good thing, it produces color
13 that's accurate, okay. And it's a little funny to talk
14 about emotions but, actually, emotions are deeply
15 connected to color, and emotions are deeply connected to
16 wellbeing, and emotions are deeply connected to health.

17 So, we're actually talking about the core of
18 life, the core of our most important visual sense and it
19 does matter.

20 Now, here's the issue, unnatural, crooked
21 spectra, which is what you get if you don't try hard to
22 do a better job with many electric light sources,
23 produce distorted, crooked colors. They produce
24 misinformation.

25 And Terry, with respect, I'll correct one thing

1 that you said, which is that an 80 CRI is 80 percent of
2 the quality of an incandescent. I know you know this,
3 but I'll just, for the benefit of others, say, actually,
4 an incandescent distorts color zero. And a CRI of 80
5 distorts colors noticeably, seriously, to an extent that
6 people don't like and infinitely more than incandescent.

7 So, it's the difference from 100 that measures
8 the distortion and a distortion of 80 is a problem and
9 people complain about it.

10 Interestingly, there's evidence that people have
11 an unconscious dislike of color distortion related to,
12 it's an interesting psychological issue, but the fact
13 that we're always monitoring ourselves, people are
14 always unconsciously aware of how they feel.

15 And if they feel off, if things feel weird for
16 any reason, and color's a good example of something that
17 can make somebody feel weird, we can actually feel sick.

18 This is the common explanation of motion
19 sickness, a common problem that's caused when you get
20 spatial, perceptual mismatch that makes you feel bad.
21 And there are people who actually say they feel unwell
22 when exposed to colors that just don't feel good. Not
23 everybody, but some people are particularly sensitive to
24 this, and I think we've all run into that.

25 So, it's a major issue.

1 So, I'd like to try to boil all of this down,
2 this issue on CRI to just one simple example choice.
3 And I'm over-simplifying, but this is approximately
4 correct.

5 Think about this, picture two lamp sockets, the
6 same socket, and we're going to put in each of them a
7 lamp drawing the same amount of electric power. Okay,
8 it's a very simple side-by-side comparison.

9 Lamp A produces 800 lumens and at a CRI of 90,
10 okay, a very simple situation.

11 Lamp B produces 900 lumens and has a CRI of 80.
12 In a sense this is the choice before us today, which of
13 those is better? How can you tell?

14 Well, because you add those numbers together,
15 would that be a clue? Of course not. You know, how
16 could you tell, scientifically, which of those is
17 better?

18 I only know of one way, have people experience
19 it, okay. Have people try both of those. The same
20 amount of power, which gives people better light, okay.

21 Now, the truth is we don't even have to have
22 people try it because we know, because it's so
23 absolutely crystal clear Option A is better.

24 So, how can I know that? Well, any vision
25 psychologist will tell you 800 lumens versus 900 lumens,

1 a human being can't even see that difference. If you
2 walk out of a room and somebody lowers the light level
3 by a factor of two, and you walk back into the room,
4 even then you might not notice. People are just very
5 insensitive to the total amount of lumens. It has to be
6 about right, but it's not critical.

7 But the difference in color, you can see it, and
8 with respect there may be some situations where some
9 people can't see a color difference or don't care, no
10 question about it. But there are many people who are
11 really disturbed by CRI 80, it just makes them feel
12 crappy.

13 And the point is we don't need to go there,
14 there's just no driving force to go there. The efficacy
15 argument certainly doesn't apply.

16 By the way, the efficacy argument, as Michael
17 said earlier, is nonsense anyway in the sense that the
18 gain comes from the adoption, whether it's efficacy of
19 80 or efficacy of 90 doesn't matter. What matters is
20 that the energy-saving lamps get used.

21 But the fact is even at the detailed level of 10
22 percent or 15 percent it's a complete non-issue because
23 high color rendering light works better for people.
24 And, in fact, we've got lots and lots of evidence where
25 people who have the choice between having more light of

1 poor color quality, or less light of high color quality,
2 and they go for less light.

3 A typical example, we've all seen it, you're in
4 your office or in your home and there's daylight coming
5 through the window what do they do with the electric
6 lights? Even if it's too dark, most people turn off the
7 electric lights if they're fluorescent lights that is,
8 like in an office.

9 So, anyway, we know that this is true. And I'll
10 go so far as to say I haven't encountered anybody who
11 truly understands the physics, the psychology and the
12 economics that doesn't agree with that point.

13 And, you know, nobody wants B when they really
14 understand it.

15 So, that's it. I'm just making the point Natty
16 is the clear and, in my view, obvious best choice.
17 thank you.

18 Any short questions on that?

19 MR. FLAMM: Thank you, Lorne.

20 So, I think we can squeeze this next segment in
21 before lunch. So, next we're going to hear from some
22 industry folks regarding the California quality
23 specification.

24 First, I'm going to ask Gary Trott, VP of
25 Product Management from CREE Lighting.

1 MR. TROTT: Thank you, Gary. Is the sound
2 coming okay?

3 So, thank you for the opportunity to speak here
4 today. And Cree really was looking forward to this
5 because we strongly support the direction that this is
6 going and believe that it really achieves what is our
7 goal, and I think a lot of us in the room's goal, which
8 is to significantly expand adoption and usage of energy-
9 efficient quality LED lighting in California homes.

10 Now, as we've been involved in these discussions
11 from the beginning, there's really a key thing that we
12 really focused on and that was balance, balance between
13 what does a consumer want, and what they experience, and
14 what do they pay for?

15 Because, obviously, with CFLs, we swung way too
16 far to one side of the balance which was cost, and
17 performance was hugely sacrificed.

18 So, we looked at each of these items and said,
19 okay, if we do this balance, we want to make sure if
20 we're gaining cost which, by the way, you know, as Mr.
21 Whitehead mentioned, higher CRI costs more, but what are
22 you getting in return? And so we balanced those things
23 as we went along.

24 And so as we thought about it, as well, we
25 wanted to make sure that the standard was such that it

1 didn't slow down innovation and gave plenty of
2 opportunity for new product introductions to continue
3 and the consumer's choice wasn't limited.

4 So, we support the standard. There are a few
5 things that we want to discuss and mention that maybe
6 could use a little bit of a fine tuning, or slight
7 changes.

8 And the first one we'll talk about is color
9 rendering index. We do believe 90 is the right choice
10 because we have studied this very closely and based on
11 hundreds of reviews, online and people who have actually
12 used and experienced LED lights, that their number one
13 criteria that they considered was color quality and
14 color point.

15 Now, the other point is that when you put this
16 in your home and you see the colors, and the way things
17 are rendered, it's better.

18 Now, one thing that I do want to mention related
19 to cost, now there are many ways to get the 90 CRI, and
20 there are many ways of it getting better and better.

21 And I'll use an example, and I also thank Mr.
22 Feit for a couple of the Cree plugs earlier, but one of
23 the lights that was there is a light that's sold through
24 Home Depot today, that if you look at the quality
25 standard as it was written on the piece of paper that

1 was handed out, it meets that. And it's for sale for
2 \$34.97 at the Home Depot.

3 When it was first introduced in 2010 it was \$50.
4 Okay, so \$50 down to \$35 within that period of time,
5 that's significant improvements in cost. Now, will it
6 continue at that same rate? Time will only tell.

7 But if you look at all the innovations that
8 everyone in this room, all the manufacturers are doing,
9 there are ways to get there and ways to get there better
10 when we're challenged to do so. So, that's one thing
11 about CRI.

12 The other, related to one of the things we'd
13 recommend is right now the standard recommends R9
14 greater than zero. Now, R9 essentially is how well does
15 it render that red color there. And at an R9 of zero,
16 it's our belief that that's not high enough.

17 And the key thing about reds, think about what
18 is in this room that has red in it? This table top, the
19 grain, so that could be a cabinet in the home, our
20 faces.

21 If we're eating in a restaurant, the food we
22 eat, are in the kitchen, what color is the red of the
23 meat or the apples, right. Red is everywhere, red is
24 critical.

25 And so an R9 of zero, really, even though the

1 CRI is 80, R9 isn't that exceptional at zero, so we
2 recommend that being increased to 50. That would be our
3 recommendation.

4 I think there's another issue around color
5 related to color point and color point consistency. So,
6 we've been fortunate that we've sold -- we've sold
7 millions of down lights into residential applications.

8 Now, the experience is that the color
9 consistency as right now, at four MacAdam steps is
10 appropriate. And there are two MacAdam steps between
11 the models. We don't understand that. That seems --
12 one, it's tight. And tighter that is necessary based on
13 what we've seen.

14 And so going back to that balance, so you have
15 the balance of this increase in cost and the color, or
16 whatever the benefit is. We don't see the benefit
17 there.

18 And as an LED manufacturer, I mean, obviously,
19 that means we would -- if it was a tighter bin that we
20 would sell we, as an LED manufacturer, would make more
21 money, but that would transfer into a higher cost to the
22 manufacturer and, thus, to the end-user, which we
23 believe would then slow adoption, because four MacAdam
24 steps we believe is the right -- the right number for
25 consistency.

1 And, of course, you know, as Michael's pointed
2 out, that research can help bear that out in the future,
3 but at this point that's what our thinking is.

4 On the directionality, we support that it's the
5 Energy Star -- the Energy Star as being the standard is
6 good.

7 We also recommend considering other
8 distributions that are optimized for the various
9 applications, whether it's a sconce, a table lamp, or a
10 pendant where maybe some directionality could help, or
11 other asymmetry that's not like the A lamp, because A
12 lamp is what it is but -- and lamps and fixtures have
13 been optimized around it, but is there something more
14 that could be done with that distribution?

15 If it was different and optimized for that
16 application, we could save even more lumens and more
17 money.

18 Some others, and I'm almost done, so on the
19 directionality. Now, longevity is something that has
20 been brought up, and we've talked about the lifetime and
21 the warranty, okay.

22 Well, how valuable, how good is a warranty? So,
23 a manufacturer puts a warranty on a box, and most
24 manufacturers who are participating in this are -- you
25 can believe a warranty. A five-year warranty, great.

1 But there are a lot of other companies that
2 maybe aren't or can't, so how can you make sure that
3 that warranty is worth something?

4 And so one thing we would like to recommend be
5 considered is a performance bond for manufacturers who
6 would receive or be participating in this rebate
7 program.

8 Make sure that if there are issues and that
9 company's no longer around how will -- how will the
10 consumer be taken care of?

11 So, the final point, and this is a simpler one,
12 is that when you walk into a room and you flip on a wall
13 switch what do you want to have happen?

14 You want the lights to come on right away,
15 right? So, if you have to wait a second for that to
16 come on, like all of us have experienced with the CFL,
17 what do you? You say, oh, let me flip the switch again,
18 wait, something's wrong and you finally get trained and
19 you figure out what to do, right?

20 But what we've found is that 250 milliseconds or
21 a quarter second is the appropriate number so that when
22 you flip it on, it's quick enough that somebody won't
23 have the double clutch reaction and the issue.

24 So, I don't believe that's in the standard now
25 and that's something we recommend be added.

1 So, again, we appreciate the opportunity speak,
2 strongly support this, and thank you for your time.

3 (Off-record question)

4 MR. TROTT: Dimming, absolutely. Dimmability is
5 key.

6 MR. FLAMM: Thank you Gary, nice name.

7 (Laughter)

8 MR. FLAMM: So, next we're going to ask Pam
9 Horner -- I like your name, too, Pam.

10 She's the Senior Director of Government and
11 Industry Relations, Osram Sylvania.

12 Do you want to come up here or do you want to
13 sit?

14 MS. HORNER: We need a longer --

15 MR. FLAMM: Oh, Pam is wonderful. Pam used to
16 be the President of the IESNA, back when I had hair, so
17 she's been around for a while.

18 (Laughter)

19 MS. HORNER: Okay. I know, what a facilitator.
20 I guess that means I am indeed part of the silver
21 tsunami.

22 Well, I'm sure glad I wasn't going to talk about
23 color.

24 Commissioners, thank you very much, David, thank
25 you, Gary, for inviting me to speak for just a couple of

1 minutes before lunch.

2 Michael, are you around? I would take -- I just
3 wanted -- I added this to my notes.

4 I don't believe that the road to Huffman, as you
5 call it, is paved by only solid state lighting. Sorry
6 about that, there are -- along with the bulbs, I think
7 there's a lot to go along with it, including systems
8 thinking and controls.

9 So, lest we think that this is the entire
10 solution, we have to think about that again.

11 But we're here to talk about the California
12 Quality LED spec.

13 I'm only representing my company today, not
14 industry. And after consulting with our Global
15 Marketing Product Management and Technical folks, we can
16 all agree that in general we do support the idea of a
17 quality LED lamp specification which we believe would
18 create a higher standard for at least a portion of the
19 California market.

20 And the other thing that we agree on is that we
21 appreciate the sensitivity that California is taking
22 here, not only that CFL experience is driving this, but
23 also I really want to thank you for listening when we
24 said we are skeptical about this, this was about a year
25 ago, if this is going to drive more testing, more

1 regulation on an industry that's crushed by that right
2 now.

3 And so we think whether you're going to end up
4 calling it Energy Star Plus is another matter.

5 But when you refer to tests that we already have
6 to comply with, perform and then set certain higher
7 parameters, that makes a lot of sense to us, so thank
8 you for that.

9 That would have been a -- I would be saying
10 different words right now if that had happened.

11 So, what I wanted to do is add to that another
12 statement is that we are, indeed, willing to continue to
13 work with staff to examine certain further refinements.

14 I wanted to pick out -- Gary, I'm glad you
15 picked out some. I picked out three, one is not color.

16 On the compatibility side, I see that you
17 currently refer to whatever Energy Star decides. That's
18 thorny.

19 One of the things that we will offer in future
20 discussions, I just want to give you a little heads up,
21 is a sort of what I call a practical and modern
22 mandatory requirement, which would be, of course,
23 something we already do, which is to do website postings
24 that give -- compatibility with dimmers is, I think, a
25 critical issue.

1 So, I've got Exhibit A here, and I'll hand it to
2 you, Gary, which indicates listings of dimmers. A lot
3 of the manufacturers do this and I just highly recommend
4 it because you can keep up with the times, you can keep
5 up with the changes, and it's not on the box that you
6 throw away when you put in the new lamp.

7 So, I really want you to look at that as an
8 idea.

9 The second one is on reflector lamps. Now, Owen
10 said omnidirectional flood lamps and spotlights. But on
11 page 28 of the specification it says flood lamps, only.

12 Our folks are very interested in adding spots
13 sooner, rather than later. And we're interested in
14 having that discussion. Although, maybe, I had an older
15 version of the white paper, I don't know.

16 And the third and final one I wanted to mention
17 is the longevity issue. Within the current white paper
18 you defer, as Energy Star Graph 2 does, to what they
19 call commercial versus residential, so having a lifetime
20 differential.

21 Hey, guys, we don't market our stuff that way.
22 This is tantamount to say, yeah, I promise, I really am
23 a residential application, rather than an application.
24 So, I think decide on one and just pick, but we can have
25 that conversation.

1 So, I have one caution and one question. One
2 caution from our folks is that the Commission needs to
3 move sooner rather than later on this. And I think
4 people have alluded to that.

5 These lamps are going to cost more, there's no
6 doubt about that, that's something that is a reality
7 that needs to be cautioned, so it won't hit a hundred
8 percent of the market.

9 But the point I'm trying to make is that as each
10 minute goes by those sockets are being filled with snow
11 cones so -- Owen and I call them the same thing.

12 And then the other one is a question. And that
13 is I was reading through the specification carefully and
14 on page 29, if you want to make a note of that, we talk
15 about manufacturers may certify these products.

16 And then Owen, I think it was, said, clearly,
17 we're not going to have a list of the lamps that do
18 certify, so why would we bother to certify?

19 I think we need to examine -- you know, you may.
20 Does a may become a have to? I mean these are things I
21 think we need to flesh out.

22 So, again, I thank you for the opportunity.
23 Here's Exhibit A, Mr. No-Hair.

24 (Laughter)

25 MR. FLAMM: And just like Terry, you're only 40

1 years old. Thank you.

2 So, you know, I think to answer really quick, we
3 originally -- staff proposed to manufacturers to certify
4 the products, but we were advised by our legal counsel
5 that it was inappropriate.

6 So, if there's any version that says that you
7 may certify, we're not going to be pursuing
8 certification.

9 MR. MC GARAGHAN: The utilities, presumably,
10 will be managing the list and sort of per some normal
11 procedure that they already have in some existing
12 program. So, we need to talk about what that actually
13 looks like.

14 MR. FLAMM: Yes, I agree.

15 So, I just turned my agenda on the floor, a
16 little comic relief here.

17 So, Tim Okeefe, are you here? Oh, Tim, do you
18 want to come up, please? A Specification Engineer from
19 GE Lighting. You want to speak from there? Okay, Tim.

20 MR. OKEEFE: Thank you, Gary. So, just a
21 general comment and we will have written comments to
22 follow, but GE Lighting supports a higher quality LED
23 replacement lamp specification that will encourage
24 consumer adoption of LED products, provided the
25 specification is achievable and cost effective.

1 And thanks for the opportunity to be here and,
2 like I said, we'll have written comments to follow.

3 MR. FLAMM: Thank you.

4 And so then Willem Smitt is from Soraa, Inc.,
5 Director of Product Marketing.

6 MR. SMITT: I represent Soraa. We are a start-
7 up from Fremont, California, about four years old. We
8 were founded by three professors from UC Santa Barbara
9 in 2008. And we are a company that innovates on the
10 core material system of the LED, itself, the LED
11 semiconductor.

12 And while we have the option to apply our
13 innovations to ever increasing efficiencies and more
14 output, we have decided to apply the high efficacy that
15 we get out of the core LED semiconductor to provide
16 better quality of light.

17 The feedback that we get on our lamp is that in
18 many ways it out performs halogen MR16, that's the lamp
19 that we tried to replace, both from a beam quality
20 perspective, and also from a color perspective.

21 So, what we learned from that, that if we apply
22 the technology in an appropriate way there's no reason
23 why we have to talk about equivalents, we can exceed
24 what incandescents and halogens do today.

25 And that's feedback that we get from our

1 customers. We have customers that do installation where
2 they look at halogen versus Soraa MR16 lamp and they
3 conclude that colors look better from a solid state
4 lighting lamp.

5 And in terms of driving transformation in the
6 market, I believe that based on this feedback that we
7 have is that we should focus on quality equipment or
8 improving quality of life, first, and that will drive
9 more efficiency, overall energy savings and lower power
10 consumption.

11 The lamp that we offer today is an MR16 lamp.
12 People use it mainly in commercial applications. It has
13 a CRI of 95. It delivers an R9 of 98, which is actually
14 higher than a lot of halogen lamps do because they have
15 an R9 of only 93 or 95, which is also really good, but
16 that's a proof point that we can do better.

17 We believe that with respect to power
18 distribution, it was showed earlier today, is really
19 important. It comes back into everything that we see in
20 how you perceive color. That's why the innovation of a
21 better quality of light is really driven.

22 We spend a lot of time and effort not only
23 improving that, but also funding research to help us
24 better understand what the connection is between how
25 people perceive colors, how people appreciate colors,

1 and there seems to be a strong connection, as was
2 suggested earlier today, between brightness, perception
3 and color perception.

4 Well, that means that if colors are more
5 saturated, if they're more natural, people are inclined
6 to tune down the light levels, which is really important
7 for energy savings.

8 I would like to thank you for the opportunity to
9 be here today. Thank you.

10 MR. FLAMM: Thank you.

11 So, after lunch we're going to have a segment
12 where the utility folks are going to discuss this.

13 And I would like to invite any -- you know, any
14 other manufacturers who want to speak after that to
15 come -- you know, an opportunity to discuss this.

16 It's 12:15, so why don't we reconvene at 1:15.
17 Thank you.

18 (Off the record at 12:15 p.m.)

19 (Reconvene at 1:21 p.m.)

20 MR. FLAMM: Is everybody here? Okay, let's
21 start back up. What I'm going to ask is as people
22 speak, go up to the podium where Mr. Eilert is right
23 now, and identify yourself every time you speak.

24 Please don't speak across the room because when
25 you do that, the court reporter doesn't capture that

1 correctly.

2 So, I'm going to start with Pat Eilert, please.

3 MR. EILERT: Great. So, Gary, a little change
4 of plan, so I'm going to share my time with my colleague
5 Mr. Fernstrom and my other colleague Ms. Winsey Kan.
6 And we've already sorted out the time with Mr. Parks, so
7 we should be done.

8 So, I just want to start with a very brief
9 statement. So as you can see, this morning we're
10 investing some time and effort into some of the research
11 and analysis for this quality spec because we think
12 there is a unique opportunity to both save some time and
13 save some money relatively to business as usual.

14 There's been a few hiccups in the past, in the
15 lighting area, despite the fact that, you know, along
16 with the fact that we've actually saved a huge amount of
17 energy in the State from efficient lighting products,
18 you know, if you think back in the late eighties when TA
19 or electronic ballasts were introduced, there was a
20 fairly significant hiccup there because of poor quality
21 and reliability.

22 Similarly, there was another hiccup in the early
23 2000s due to LED traffic signals. And I won't belabor
24 the CFL story here, again.

25 But if we can get this right the first time, we

1 will save time and rebate dollars, from a utility
2 perspective, to try to achieve the goals otherwise.

3 So, this is an extremely important project going
4 forward and we support it.

5 The second point I want to make is that we also
6 think that we need to follow up with a mandatory Title
7 20 spec as soon as possible. Even if we get this right
8 and we have rebates associated with these products,
9 there will still be low-price products on the shelf that
10 may or may not meet the customer's expectations.

11 So, we need to go to Title 20 as fast as
12 possible. And I want to clarify now that if went this
13 route there's going to be plenty of products out there
14 to meet the things that don't require, you know, a 90
15 CRI.

16 If we don't think we want a 90 CRI in, you know,
17 some space around the home, like the garage or
18 something, incandescents will still be there even if we
19 have a Title 20 spec, CFLs will still be there.

20 With that, I'd like Mr. Fernstrom to show you
21 his toys.

22 MR. FERNSTROM: So, I'd like to very quickly
23 show you some examples to help make this real for
24 everybody. I have a Philips LED A lamp substitute here.
25 Well, what happened? Oh, I've got the wrong control.

1 You can see it has pretty good color, it has a
2 fairly even light distribution, and it's pretty nicely
3 dimmable, although you do see a little flickering when
4 we get down here to very low light levels.

5 The second example I'd like to show you, we call
6 the CFLS, what, the twist lamp, the snow cone lamp, I
7 like to call this one the mushroom lamp.

8 It is a little higher color temperature, is
9 similarly dimmable, flickers a little bit at low levels,
10 and probably doesn't have as good a light distribution
11 as the first one I showed you.

12 By the way, the Philips lamp is simply
13 representative of what all the major manufacturers have
14 that are best in class.

15 In my home I have a lot of lighting controls,
16 dimmers and occupancy sensors. This lamp, you can see
17 on the ceiling, has come up to full brightness but, uh-
18 oh, what's happening here?

19 Now, I have to admit, in order to provide this
20 illustration I cheated a little bit. This is not a
21 dimmable lamp. However, many consumers aren't really
22 aware of the difference and lacking support in this
23 specification for really nice dimmability, I'm sure
24 we're going to run into some compatibility issues.

25 And that's the point I'd like to emphasize, this

1 is an LED quality spec. There are many, many
2 compatibility issues with dimmers and occupancy sensors.
3 So, if I go to the hardware store to buy a nice LED lamp
4 I can find one, but odds are I'm not necessarily going
5 to be able to find a dimmer or an occupancy sensor
6 that's truly compatible with it.

7 So, I'd just like to emphasize the point, if we
8 really want to achieve high consumer acceptability we
9 need to look at the LED products, themselves, as well as
10 the related controls to assure compatibility.

11 Winsey.

12 MS. KAN: My name's Winsey Kan and I work at
13 PG&E, running the Residential Lighting Program, so I
14 work with manufacturers every day to implement our
15 lighting program.

16 And I want to say that PG&E, as a program, we do
17 support this spec, but then at the same time we need to
18 have time and collaboration with the ED to work out an
19 implementation plan.

20 Because right now, as we know it, there's not a
21 lot of products in the market that meets the spec and
22 then, also, there will need to be additional testing for
23 all of these products.

24 So, we will need more time and we will need to
25 get to a place where there is significant or enough

1 products for us to support in order for us to meet our
2 energy savings goal at a price that makes sense to the
3 customer.

4 So, that's it.

5 MR. FLAMM: Thank you. So, I'm going to ask the
6 next person on the agenda is Jim Parks. Are you here?

7 Oh, there you are, Jim.

8 Jim is the Program Manager at the Sacramento
9 Municipal Utility District.

10 MR. PARKS: Yeah, and I'm representing SMUD
11 today in support of this specification. And I just have
12 a few points that I'd like to make. I think it's
13 important that it is a voluntary specification right now
14 because I don't think the bugs have been entirely worked
15 out.

16 I think one of the things that I thought of,
17 too, is what Gary had pointed out, the dimming needs to
18 be determined. And then, also, as also has been pointed
19 out, we need to have more products in the market.

20 Utilities develop their energy efficiency
21 programs typically based on cost effectiveness and,
22 also, somewhat to availability, and so both of those
23 things need to be covered.

24 But we are, when we see enough of -- you know,
25 either we can do a two-tier rebate, which I don't think

1 is necessarily the best. I think if we had enough
2 product in the market we could just put all our eggs in
3 one basket and say this is the direction that we're
4 going.

5 But I'd like to be sure that the customers can
6 get it, they can dim it, and they'll be happy with it.

7 And we've had all the comparisons to CFLs that
8 we need.

9 I also sit on the Board for the Consortium of
10 Energy Efficiency and they have over 130 members across
11 the United States and Canada, and they are very
12 interested in this spec, also, and I brought it to their
13 attention.

14 So I see that, once again, it's an opportunity
15 for California to lead the way for the rest of the
16 nation.

17 So, we fully support this spec. We believe it
18 will have a great impact and we believe it will be a
19 good experience for both consumers and utilities alike.

20 Thank you.

21 MR. FLAMM: Thank you, Jim.

22 So, are there any other utility folks who would
23 like to speak up?

24 MR. LY: Hi, this is Vireak Ly from Southern
25 California Edison.

1 I'm here to support the overall concept of
2 higher quality lamps. Higher quality lamps is critical
3 to the success of LED technology, you know, similar to
4 the LED -- I mean the CLF example.

5 However, you know, the CLF did run into some
6 hurdles because it was a new technology in its market
7 then.

8 LED is also a new technology in its market and
9 so there will be challenges that we may not foresee
10 right now.

11 And so I think in order to capture all of these
12 unforeseen challenges, I think a lot of coordination,
13 collaboration among utilities, government, as well as
14 industry is critical to the proper and successful
15 implementation of the standard.

16 We're kind of treading -- you know, if you're
17 too far to the right or to the left, there may be
18 quality implications and then there may be cost
19 implications as well.

20 And so as a utility, we need to be able to
21 maintain that cost effectiveness and, yet, also help
22 promote high quality, sustainable, lasting products in
23 the market as well.

24 And so I think the main point I'd like to make
25 is that we need to work together, a lot of coordination,

1 a lot of collaboration to ensure that this spec is on
2 the spot to make efficient, as possible, this transition
3 to LED technology, to accelerate, you know, as
4 efficiently as possible the market adoption of this
5 technology.

6 MR. FLAMM: Thank you, Vireak.

7 What I would like to suggest that we do from
8 this point is that we open the floor to some general
9 comments, but then transition to the five specs, talk
10 about them one at a time, talk about the dimmability,
11 talk about the color, et cetera. Does that sound
12 appropriate?

13 So, I ask for just some general -- okay, we have
14 Jim Gaines from Philips Lighting Company on the phone,
15 who would like to speak.

16 MR. GAINES: Yes, okay, can you hear me?

17 MR. FLAMM: Yes.

18 MR. GAINES: Okay. I'm here representing
19 Philips. We certainly all want to avoid a repeat of the
20 slow adoption of CFLs. But many of the CFLs that were
21 sold and rebated in California weren't even Energy Star.

22 So, our impression is that basing the spec on
23 dissatisfaction with Energy Star is not really the right
24 thing to do.

25 In Philips' opinion, over-emphasis on

1 performance will be just as detrimental as an over-
2 emphasis on cost. Over-emphasis on cost leads to poor
3 light quality and dissatisfied customers.

4 Over-emphasis on performance will lead to high
5 cost and dissatisfied customers.

6 It's our belief is that the best is one that's
7 going to balance and it is also the method that will
8 make most effective use of limited rebate budgets.

9 There's a lot of background noise, can you hear
10 me?

11 MR. FLAMM: We can hear you fine, thank you.

12 MR. GAINES: Okay, good. If the California
13 specification is made to be very narrow, then the effect
14 is going to be to eliminate some of the benefits of SSL
15 technology, such as the ability to pick lamps with
16 different CCTs, different CRIs, different efficacy,
17 different cost and so on, based on the customer's
18 application.

19 Although the standard is, in principle,
20 voluntary, if the rebate's large it's really not
21 voluntary because other lamps can't compete.

22 So, lamps that don't meet the standard, but
23 might provide other benefits, will be excluded because
24 customers will choose the cheaper rebated lamp for all
25 applications.

1 And another consequence is the consumer will
2 remain ignorant of the possibilities of SSL. If there's
3 only one realistic choice, there's no motivation to
4 learn what the possible variations are and what they
5 mean for the consumer's applications.

6 So, the general message from Philips Lighting,
7 for the California spec, is that California should
8 implement the Energy Star specs in the criteria. And
9 then California should do the comprehensive studies,
10 which have been suggested over the past year by Michael
11 Siminovitch, to see what the minimum performance
12 parameters for widespread customer adoption really are.

13 And only after those parameters are determined
14 should any changes be made to the standard, to the
15 specification.

16 If too high a standards are enacted,
17 California's ironically risking stunting the adoption of
18 SSL by requiring unnecessarily high performance specs
19 and artificially forcing the price to be too high.

20 The specs that we disagree with include the CRI
21 of 90, where we don't think it needs to be that high, 80
22 we think will be fine.

23 The tight color spec, certainly the two MacAdam
24 steps from the average, but even the four we think
25 should be probably five, depending on what tolerance you

1 put on it.

2 The power factor of .9, this is a new spec that
3 has no influence on consumer adoption. There's also no
4 evidence that high power factor is needed for such low
5 power lamps. Michael Siminovitch has also made
6 statements to this effects and quoted studies that CFLs,
7 with their much higher distortion and lower power factor
8 have not caused disturbances in the grid.

9 There are some other things, but I won't keep
10 talking about them.

11 The specs, I want to say the specs are certainly
12 possible to reach, so I'm not claiming they're not
13 possible to reach, and our L-prize lamps, except for the
14 power factor, certainly demonstrates that.

15 We don't see good evidence that the customer
16 requires these high specs.

17 The detriment of increased cost is likely to far
18 outweigh the benefit from it.

19 Like I said, we have experience with the L-prize
20 lamp and with its lower cost EnduraLED alternative.

21 And our experience is that customers are
22 adopting the lower cost lamp at much greater rate than
23 the high performance L-prize lamp, despite similar
24 rebates on both lamps.

25 Philips, since the time the L-prize came on the

1 market, we've sold about ten times as many of the lower
2 price lamps as the L-prize lamps.

3 So, our practical experience shows that the
4 customer's quite happy with the performance of the
5 Energy Star spec EnduraLED lamp and is not happy with
6 the price of the L-prize lamp.

7 We think the California bulb spec, which is
8 closer to the L-prize, is too strict and will result in
9 lower adoption rates than an Energy Star equal spec.

10 We're certainly open to further discussion on
11 the comparison between L-prize and EnduraLED performance
12 in the marketplace.

13 We'd be happy to give more details in a profit
14 setting to elaborate on this position.

15 And I'll stop there.

16 MR. FLAMM: Thank you. Do I understand that
17 Alex Bosenberg is online?

18 MR. BOSENBERG: Yes, can you hear me?

19 MR. FLAMM: Yes, Alex.

20 MR. BOSENBERG: Okay, thank you. I want to
21 thank the Commission for this opportunity speak, and
22 I've listened to the ongoings with great interest.

23 I won't belabor some of the comments already
24 made about concerns over a very ambitious specification,
25 but I do want to correct one statement I heard earlier

1 and possibly influence the mindset of everyone involved
2 by doing so.

3 Owen was speaking about the Energy Star lamps or
4 perhaps about the Energy Star CFL and LED
5 specifications, and mentioned it as a consensus process.
6 It is not a consensus process. The EPA runs that
7 program independently of Federal oversight, such as is
8 given to the Department of Energy.

9 The Department of Energy is required to perform
10 financial and technological, or technical feasibility
11 studies as part of their rulemakings on Federal minimum
12 efficiency.

13 The EPA is not bound by that. Certainly, many
14 of our lengthy comments to the Energy Star's Lamp Spec,
15 Draft 2, were related to that.

16 So, I wanted to make sure that everybody
17 understands that Energy Star is not a slam dunk. There
18 are a lot of issues with the current draft specs,
19 although I will echo the gratitude that California's not
20 racing off to do an entirely different spec. It makes
21 sense to start from some common ground, but that we are
22 engaged in a lengthy comment process on the Energy Star
23 Lamp spec because, in many ways, not to do with
24 individual parameters, but how they all add up to a very
25 difficult and costly final product.

1 So, Energy Star Plus is even harder and folks
2 have already said that, so I'll drop that.

3 I wanted to also comment on the issue of lessons
4 learned from the CFL experience. Everyone mentions that
5 every time, unfortunately. But I do want to submit to
6 those involved, especially to the Commission, that one
7 of the lessons from CFLs I hope everyone takes away, and
8 bears in mind, is the attempts for a super CFL program.
9 The failures of that and the shortfalls I hope will be
10 reexamined so that we don't repeat it for the, if you
11 will, the super LED spec.

12 NEMA and our members are very interested in
13 participating in this.

14 And I would lastly echo the comment that
15 voluntary is only voluntary if it's really an option.
16 When it becomes incentivized to the point that nothing
17 else can compete, then you get a loss of consumer choice
18 and options which I think in the end nobody likes.

19 And so we want to make sure that options are
20 preserved and competition, and everything can happen.

21 And I would disagree with the utility's
22 statement, finally, that we should move immediately to
23 Title 20 regulations. We need to see these products and
24 how they perform.

25 The studies that were suggested by Mr. Gaines, I

1 would second that.

2 We've got to figure out how this stuff works
3 well in the real world, in widespread application before
4 we regulate it.

5 And with that I will close, thank you very much.

6 MR. FLAMM: Thank you, Alex.

7 MR. EILERT: May I make a quick clarification?
8 So, I'd like to clarify two things. This is Pat Eilert
9 from PG&E, again.

10 To my knowledge, the IOUs and, in particular
11 PG&E, rebates only Energy Star compact fluorescent
12 lamps, so I just wanted to correct that.

13 And I may have mischaracterized this issue about
14 going to Title 20. As soon as possible doesn't mean
15 immediately and it probably, in practice, doesn't mean
16 until maybe 2015, when there has been substantial
17 experience and we have a lot more information about
18 this. Thank you.

19 MR. FLAMM: Thank you, Pat.

20 So, I was -- I know Mr. Feit has been waiting
21 for an opportunity to speak and I'd like to present him
22 with that opportunity, now.

23 MR. FEIT: The first thing I want to talk about
24 is dissatisfiers. Everybody here has written off CFLs
25 and I don't think we should be writing off CFLs, that's

1 first of all.

2 I think the CFL dissatisfier for standard lamps,
3 the standard bare spirals, the standard bare spirals are
4 selling in the millions and every place you go, every
5 house you go to, every restaurant you go into are using
6 CFLs. And, yes, they don't work well with dimmers and
7 that's education, but they do work well.

8 And if you're trying to reach goals in 2018, I
9 strongly suggest the \$1.25 retail CFL is going to be
10 very strong and much more energy saving than the
11 halogens at probably pretty close to the same price.

12 So, that's just a comment on CFLs.

13 Using the same dissatisfier's price, price is
14 the biggest dissatisfier out there in the LED market.
15 We have this lamp, this BR30, with the unsatisfactory
16 CRI of 80, which -- and I do have demonstrations that I
17 can show, but I'm not going to do that because it seems
18 like everybody's sold on the fact that we need 90. We
19 don't need 90.

20 You couldn't -- there's not one person here that
21 could tell the difference between an 80 and a 90 CRI on
22 the same picture that was in your presentation.

23 The presentation that you sent, that had the
24 color pictures, the color picture at 80 is doctored. It
25 isn't the correct picture. Because I took that same

1 picture and put them both -- and put it there, so it's a
2 doctored picture to make it look completely different,
3 and I do have the pictures here.

4 Nobody here will be able to tell the difference
5 between the 80 and the 90 CRI.

6 The dissatisfier is price. When this item went
7 from \$29.99 retail at the big boxes, to our product with
8 a CRI of 80, and a beam angle of about a hundred, sales
9 increased tenfold; tenfold at \$17.99. At \$15.99 it
10 increased another 500 percent.

11 Those are numbers that I can give you. Those
12 are numbers that you can go online and look at blogs
13 under Feitelectric LED BR30.

14 You can look at it at our retailers, you can
15 look at it at Lowe's, you can look at it at Costco, on
16 the BR30, there are hundreds of them there, there is not
17 one dissatisfied consumer, and usually that's what you
18 see on blogs because there are plenty of CFLs. There's
19 not one dissatisfied consumer.

20 So, what you've got is you have the situation
21 where the 80 CRI is perfect. I don't know about the L-
22 prize, but without knowing what dimmer you have, we know
23 how to make a lamp with the right dimmer, the consumer
24 tells us that.

25 If we get returns, we know it's not working with

1 the majority of the dimmers.

2 We have considerably less than a one percent
3 return rate on these lamps, considerably less than one
4 percent.

5 So, the issue is price as a dissatisfier. Of
6 course, the quality has to be there.

7 Now, when you started this project I believed
8 there wasn't an Energy Star spec on LEDs. I think you
9 started this before the Energy Star spec that came out
10 last year. We're already working on the second version
11 of the spec.

12 I definitely agree that you needed a California
13 specification for LEDs when there was no spec, but
14 there's a good spec out there now. I'm not
15 understanding why you want to take a really good spec,
16 where there really isn't a dissatisfier, the changes
17 that you are making are minor, and you want to talk
18 almost -- I'm going to say 100 percent, but 98 percent
19 of the lamps off the market for getting rebates in
20 California.

21 As I mentioned this morning, I took all of the
22 specs from the Lighting Facts website and we wound up
23 having one lamp that met all of the specs, one lamp.

24 So, unless you are immediately going -- and
25 unless you're immediately going to say we're going to

1 eliminate Energy Star as a specification, you can't --
2 you won't have any lamps in the program. You know, not
3 unless some manufacturers had advanced notice and are
4 making this product already. But nobody's listed on
5 Energy Star that meets this specification, with the
6 exception of one lamp. And that one lamp, as I said, is
7 a retail of well of a hundred dollars.

8 Yes, the spec can be met. It can be met at a
9 higher price. But in order to get that spec in the
10 market, if we have to switch to a CRI of 90, and I know
11 this morning we've been told that efficacy doesn't
12 count, but efficacy does count.

13 We are teaching the consumer to look for lumens.
14 That's what we're telling the consumer, look for the
15 lumens that you want. Look for that 750-lumen reflector
16 lamp. Look for that 800- or 900-lumen regular-shaped
17 lamp to replace a 60.

18 We have our 100-watt lamp out and our 75-watt
19 Omni. Look for that 1600 lumen lamp.

20 Now, you're saying efficacy doesn't count, so
21 now you're telling the consumer you can look for that
22 750-lumen R30 but, you know what, if it's a CRI of 90 it
23 could be 20 percent less, so it's okay to buy a 600-
24 lumen lamp.

25 The key here is education. The key isn't this

1 fictitious CRI number that the lighting showrooms want.
2 Well, clearly, the lighting showrooms want to sell
3 something better grade than the big boxes, but we know
4 where the light bulbs are being sold. The light bulbs
5 aren't being sold in lighting showrooms. Light bulbs
6 are being sold in the big boxes, in the home centers, in
7 the clubs, probably in food and drug. They're not being
8 sold out of lighting showrooms.

9 And in order to make the spec the size for the
10 price, we have the time situation. So, if you want to
11 start this and you want us to meet a spec, yes, I have
12 the lamp that is a .9 power factor, but it doesn't meet
13 another spec. And in order to get Energy Star, if we
14 switch to a -- if we switch to a 90 CRI LED and we want
15 to meet the same lumens, we have to do Energy Star
16 testing all over again from the start.

17 We also have to do UL testing all over because
18 the temperature's going to be higher if over-drive the
19 lamp.

20 I don't think there's enough here to warrant
21 this when you have the second stage Energy Star spec
22 that's pretty good.

23 MR. FLAMM: So, while you're looking at your
24 notes could I --

25 MR. FEIT: One second, I'm looking at some notes

1 that I wrote.

2 MR. FLAMM: I wanted to clarify one thing that
3 you brought up, if I could.

4 MR. FEIT: Okay, I'm sorry.

5 MR. FLAMM: There is an efficacy in the
6 standard, it's the Energy Star efficacy. It's not that
7 we're saying there is no efficacy, we're saying that the
8 Energy Star efficacy is what we're recommending and the
9 other elements are above Energy Star so --

10 MR. FEIT: Correct, I understood that. But what
11 I heard this morning is that efficacy isn't that
12 important, as long as we meet Energy Star. So, we will
13 meet Energy Star efficacy by taking this lamp down from
14 750 lumens to 600 lumens. That's what we would have to
15 do if we didn't change the driver and we used the same
16 amount of lumens -- the same amount of LEDs in order to
17 keep the same exact price.

18 So, now the consumer, who's used to buying the
19 750-lumen CFL BR30, or PAR30 in halogen, is going to
20 start looking -- is going to see a 600 lumen. I don't
21 think you're going to get increased sales. I don't
22 think the education is going to be there to tell them
23 but, guess what, it's 20 percent less light, but you've
24 got a higher CRI. I mean I think the tradeoff of price
25 going up, plus the fact that you have lower efficacy, I

1 don't think that tradeoff is good enough.

2 COMMISSIONER MC ALLISTER: So, can I ask a
3 clarifying question or two here? I appreciate all the
4 points you're making. I mean you're a businessman,
5 you're in this -- you know, you've got a lot of products
6 on the shelves out there.

7 And I guess -- and, you know, you see the data.
8 You know, the blogger I'm a little less convinced by,
9 but you know --

10 MR. FEIT: I see the sales data.

11 COMMISSIONER MC ALLISTER: Yeah, exactly, so the
12 sales data. I guess I'm curious about how -- well, one
13 observation. When I see a package, and I don't know if
14 Feit Electric does this, but when I see a package that
15 the biggest number on the package is 60-watt
16 "equivalent" down there below, right, and it's really a
17 13-watt or whatever, but it says 60 watts. And that, in
18 and of itself, the packaging seems confusing on all this
19 stuff, too, just to actually be relatively curious just
20 to find out, oh, it's not actually 60 watts, it's 13
21 watts, it's a 60-watt replacement, or a 60-watt
22 equivalent or whatever the marketing pitch is. I'm
23 always confused by that and I think the markings of
24 packages could be a lot more educationally, actually,
25 for consumers just generally so that it helps them along

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1 this journey of understanding what they're actually
2 shopping for.

3 You know, one thing we ought to be talking about
4 at some point is alternative metrics to just the lumens.
5 Because what you've said and I mean what -- I think, you
6 know, a lot of what you've said I think a lot of people
7 in this room would agree with. But the -- you know,
8 we've been -- the marketplace has been sort of focusing
9 on this lumen idea, but that maybe isn't exactly
10 equivalent to the perception at the sort of light level
11 of the customer, right, the sort of ease of -- you know,
12 the strain on the eye or the quality of the visual
13 experience is not directly related to lumens per se,
14 right?

15 So, the actual consumer value is not -- doesn't
16 track exactly with lumens, there are other things that
17 are involved there.

18 So, the question -- one question is do we want
19 to get into more complexity in trying to educate
20 consumers in a different way going forward? I think
21 that's a real valid question.

22 So, my question for you is if you -- and I
23 understand that you want -- you know, you want rebates
24 for as many of your products as possible. That's what
25 I'm assuming, I mean and correct me if I'm wrong there,

1 it will help your market grow.

2 But if you had two products out there that were
3 kind of in the same space and one of them met the
4 California spec and one of them met Energy Star, but not
5 the California spec, the former was slightly more
6 expensive but got a rebate from the utility, the latter
7 was still on the shelves, but did not get that
8 additional rebate, how would you envision that playing
9 out sort of for your products?

10 MR. FEIT: So, let me first say that -- thank
11 you for your comments.

12 But let me first say that if there were two
13 products on the shelf and one met the California spec
14 and one didn't meet the California spec, the one that
15 didn't meet the California -- and there were no rebates,
16 the one that didn't meet the California spec would sell.

17 The one that met the California spec would not
18 sell.

19 One, if it met the same lumens it would be more
20 expensive. If it was the same price, it would have less
21 lumens. So, it would not sell. I'm talking about what
22 you -- talking about what you said about lumens, we're
23 trying -- we're trying to educate the consumer not to
24 look for that 60 watt, we're trying to get them to look
25 for the lumens.

1 So, to do something else now, and try to do
2 reflectors with some --

3 COMMISSIONER MC ALLISTER: Why not educate them
4 to look for the 12 watts?

5 MR. FEIT: Because there are different lumens
6 for 12 watts depending on the lamp type. You can have a
7 12-watt reflector, you can -- there's different lumens
8 for the watts, it's not -- it's the same way with a 60-
9 watt light bulb, they're not all 800 -- incandescent,
10 they're not all 800 lumens.

11 COMMISSIONER MC ALLISTER: Right, but all 60-
12 watt light bulbs, incandescent light bulbs are 100 CRI.

13 MR. FEIT: Yes.

14 COMMISSIONER MC ALLISTER: Right?

15 MR. FEIT: Yes.

16 COMMISSIONER MC ALLISTER: So that's the
17 difference.

18 MR. FEIT: Yes. But a consumer is not looking
19 for CRI.

20 COMMISSIONER MC ALLISTER: Exactly, but the
21 consumer -- I mean my understanding of much of the --
22 much of what I know and am learning today is that that
23 actually isn't the whole story, isn't there, there's
24 sort of a quality of experience that doesn't track
25 either with lumens -- well, it sort of tracks with

1 something that's a combination of lumens and CRI, that I
2 think we would be at pains to educate the consumer
3 easily and simply about.

4 So, that's really my question is how can we --
5 what metric could we use, if it's not lumens, or is
6 lumens it and we should stick with it?

7 MR. FEIT: I'm just saying that the 80 CRI that
8 Energy Star has is acceptable to the consumer, to the
9 average consumer and the numbers that I have on the
10 sales numbers, and I'm sure the numbers that Philips
11 has, and I'm sure the other numbers will show that
12 they're satisfied with that.

13 Just one thing on the lumens and the 40-watt or
14 60-watt replacement, we had a non-Energy Star lamp that
15 we sold, that was marked 40-watt replacement because it
16 was 500 lumens. We put that out with 40-watt
17 replacement, out in the marketplace, with the lumens,
18 500 lumens on it. We then took the same exact product
19 and went with the new FDC regulations and took 40-watt
20 replacement out, and just sold it as a 500-lumen lamp.
21 It sold five times better.

22 When it was a 40-watt, the consumer didn't want
23 to buy it. When it didn't have the "replacement" on it,
24 the consumer bought it. It happened to be a snow cone.
25 It happened to be a snow cone, so the consumers that

1 bought it, it showed them enough light. I mean we
2 showed that it was a snow cone, we showed the way the
3 light goes, so they had enough light to replace a 60-
4 watt or whatever they were trying to replace with it
5 but --

6 COMMISSIONER MC ALLISTER: Do you think they
7 actually thought that they were buying a 60-watt lamp,
8 because the 60 was big on the package?

9 MR. FEIT: No, there was no 60, there was no 40.

10 COMMISSIONER MC ALLISTER: Oh, okay. But
11 before --

12 MR. FEIT: When it said 40, they knew they were
13 buying a 40-watt replacement.

14 COMMISSIONER MC ALLISTER: Okay, they didn't
15 think it was a 40-watt lamp?

16 MR. FEIT: No, no, no, it says 40-watt
17 replacement.

18 COMMISSIONER MC ALLISTER: Because the immediate
19 impression that sometimes you get with those packages is
20 you're buying an actual 40-watt lamp.

21 MR. FEIT: So, just as a final conclusion, if
22 you're going to put these specifications into works,
23 which I believe the Energy Star specifications are more
24 than enough and I believe that you needed this
25 specification when there wasn't an Energy Star spec, if

1 you're going to do it, please give manufacturers at
2 least a year to meet the specification.

3 Because we have to go to UL, we have to go to
4 Energy Star, we have to design the lamps. And it's not
5 right for the manufacturers, who don't have advance
6 notice that this was going to be the spec, and it's not
7 right for the consumer because you're going to take this
8 good product, that's out there selling, off the market.

9 COMMISSIONER MC ALLISTER: Well, it's not that
10 it would go off the market, right, this is all
11 voluntary.

12 MR. FEIT: It's off the market if somebody has a
13 rebate and next to it there's no rebate.

14 COMMISSIONER MC ALLISTER: Right.

15 MR. FEIT: If they're both no rebate, it's not
16 off the market.

17 COMMISSIONER MC ALLISTER: If the rebate --
18 depending on how the rebate and the difference in price
19 actually interplay. I mean I think that's probably a
20 longer discussion.

21 So, I really appreciate your comments. I mean
22 this is where the rubber hits the road, this is exactly
23 the conversation that we're trying to have.

24 MR. FEIT: Right, and then I will comment in
25 writing on each specification.

1 COMMISSIONER MC ALLISTER: That's perfect.

2 And I want to kind of open it up and maybe,
3 Gary, you can make sure that folks who want to comment
4 on the various issues that Mr. Feit's brought up can,
5 and it looks like Michael's got his hand up and I'm sure
6 there's some others.

7 So, thanks very much, appreciate it.

8 MR. FEIT: Thank you.

9 COMMISSIONER MC ALLISTER: Michael, did you want
10 to -- you had your hand up there or --

11 MR. SIMINOVITCH: Oh, okay, yeah. Yeah, I'll
12 let Gary be the master of ceremonies.

13 MR. FLAMM: Oh, there you are, Michael, come on
14 up.

15 MR. SIMINOVITCH: Thank you. I think that the
16 previous comments are well taken. I would add that this
17 type of voluntary specification is really a leadership
18 opportunity. We're not going to strand a lot of
19 products early in this process.

20 A LED, omnidirectional, high-color quality lamp,
21 it's going to take some period of time before that ever
22 competes with a \$2.00 CFL lamp in the store. So,
23 there's going to be a lot of choice for consumers.

24 The whole concept behind this is to show
25 leadership and to move the marketplace, and use the

1 culture of rebates and incentives to help do that. So,
2 I don't think we're going to strand any products early
3 in this process.

4 MR. FLAMM: Thank you.

5 Carl?

6 MR. JOHNSON: Carl Johnson from the California
7 Institute for Energy and Environment.

8 And I've been working with the Energy
9 Commission, oh, since the beginning of the century,
10 mostly on R&D, development of new products, many of them
11 lighting and market transformation, so the Speed
12 Demonstration Program that has been going since 2004,
13 that helped lead to many of the code changes in the
14 lighting in this last round.

15 And I want to thank you for continuing this
16 leadership, I think this is really excellent.

17 I'd like to make several just more overview
18 points which is, one, this is not only the road to
19 Hoffman in 2018, it's also the road to AB 32 and to zero
20 net energy goals. They're all very similar.

21 And these shifts from sockets to systems will be
22 required, so we won't get there with CFLs in a socket.
23 WE can't get there. That kick that we need to get to
24 Hoffman, that Michael showed, it's the same kick we need
25 to get to zero net energy and AB 32.

1 So, this is essentially a market transformation
2 issue and how do we transform the market.

3 And there are many, many reasons, which have
4 been elaborated for, why solid state lighting can do
5 that. I think a few, the integration with controls, the
6 integration with Smart Grid have not really been
7 articulated as much, as well as the integration with
8 renewables.

9 This now is a DC device and that can take DC
10 power directly and use it with a 20 to 30 percent
11 efficiency gain.

12 All these things are the toolkit we're going to
13 need to meet these aggressive goals.

14 So, I want to emphasize that these kinds of
15 standards and these leadership standards are going to be
16 required to make those goals and I applaud you for doing
17 them.

18 You know, there's been a lot of stuff that's
19 been talking about, the CFL, and the market
20 transformation, the non-dimmability, the color, the
21 product failure, early failure rates, all those things
22 delayed it by over ten years.

23 I think this particular issue is a market
24 transformation one to really get this into the market
25 and make a difference with solid state lighting.

1 But it's really we're going to have to continue
2 this leadership with the CPUC, with the CEC, the
3 utilities and the industry proactively collaborating to
4 create the product that the market really, really loves
5 and wants to buy, and any of these features are
6 absolutely essential to do it. And they're not just
7 technical features. You don't buy it by technology, you
8 buy it because you love it and it fits in your home,
9 fits in your office.

10 So, I just wanted to thank you for doing this
11 and support the effort.

12 MR. FLAMM: Thank you, Carl.

13 Lorne?

14 MR. WHITEHEAD: Thank you, Lorne Whitehead
15 speaking again. I'll be quite brief, but I thought I
16 should just mention or repeat a point that I made
17 earlier about the need for data and reason here.

18 We've heard some very articulate remarks, but
19 the comment, for example, that the consumer finds an 80
20 CRI acceptable, that's something that needs research.
21 There are many consumers and there are many needs.

22 Now, I'll just throw out an example of one
23 consumer, a parent, let's say a mother, at 3:00 a.m. has
24 a sick child, turns on the light and looks at the
25 complexion of her child's skin, and her husband has just

1 screwed in an 80 CRI lamp into the ceiling socket and
2 the judgment can't be made. This actually isn't a joke,
3 it's one of the key things about high color quality is
4 the ability to judge.

5 So, really, the research that needs to be done
6 is to have consumers who, of course, are supreme,
7 involved in experiments where testing is done and side-
8 by-side comparisons are done. A great deal of that work
9 has already happened and the results are compelling.

10 We also have one huge data point with regard to
11 the acceptance of CFLs, themselves, at CRI of 80. So,
12 this is data, but more is needed, and that leads to one
13 other point that I'd like to refute, or one suggestion
14 I'd like to refute, made earlier, was the idea let's do
15 the research and then maybe, long from now when the
16 research is done, we can go to a higher CRI.

17 Well, that's really shifting the burden of proof
18 in the wrong direction. You know, it's true that a
19 person convicted of a crime is innocent until proven
20 guilty, but that's not how we work with health. We
21 don't work that way at all.

22 When we talk about a substance or an energy that
23 we're going to put into our bodies, the burden of proof
24 is on proving safety. So, distorting color is something
25 potentially bad for people. We don't have to do it, we

1 know it's not necessary, it's not going to cost energy
2 to do it. And if it costs any more money, it will be
3 for a short period of time and we know that from the
4 historic record.

5 So, it seems to me that, really, the question is
6 has anybody got proof that the distortion that people
7 don't like at a CRI of 80 is completely harmless?

8 And in the absence of that proof, given that we
9 have the ability to go higher, let's do it. It's an
10 easy, safe decision. Thank you.

11 MR. FLAMM: Are there any other comments? Gary.

12 MR. TROTT: Thank you. This is Gary Trott with
13 Cree. One of the questions I had, or a thought as I was
14 listening, is that, you know, the examples brought up
15 for why, perhaps, 80 CRI was good enough is because
16 products with 80 CRI are selling at higher volumes than
17 others with 90.

18 What I would offer is that's because of price.
19 I mean I don't think there's any mystery that a lower
20 price, the consumer is going to purchase that, right.

21 But the question is, and I think what is the key
22 is that what we're trying to do here is change -- not
23 only have somebody buy one lamp, but change behavior so
24 they buy more. Or when that lamp needs to be replaced,
25 they buy it again, which is where I think some of us

1 know that's where CFLs fail.

2 And one of the things that we learned from this
3 particular light over here, the one with the gray top
4 that meets the spec and is for sale, now, at \$34.97 at
5 the Home Depot, is that there's anecdotal data that
6 shows that people are either buying one or a high
7 number, a high multiple.

8 So, what that said to us is people are buying a
9 90 CRI light, putting it in, they like it and they're
10 buying some for the rest of the house.

11 So, to us, that's what we look at is that's the
12 key question. And whether or not some of these other
13 lamps -- maybe that is what's happening with some of
14 these 80 CRI ones but that, to us, is the goal and we
15 believe that the 90 CRI gives a better chance for that
16 return buy.

17 MR. FLAMM: Thank you.

18 COMMISSIONER MC ALLISTER: Actually, I have a
19 comment about that. Boy, you got my number, man I
20 spent -- I just moved houses a couple of weeks ago, a
21 few weeks ago and spent several hours at Home Depot,
22 bought a selection of LEDs, went and put them in my
23 various fixtures, figured out some of them didn't work
24 in my track lighting, and my dimmings, and my ceiling
25 fans, which seemed to be a problem, and then returned a

1 bunch of them and then bought the ones I liked in
2 quantity. So, you totally described my whole experience
3 there in ten seconds.

4 I did have one more question, actually. Sorry.
5 You know, nobody else had their hands raised, so we
6 might as well just keep you up here right?

7 MR. TROTT: Okay.

8 COMMISSIONER MC ALLISTER: But I'm wondering
9 about the -- and this isn't just -- this is not an issue
10 that's specific to the quality spec, but it's definitely
11 specific -- this definitely has to do with market
12 transformation in this sphere, and that's just sort of
13 the transparency and accountability.

14 And I guess, I'm wondering, for example, just
15 something basic like how do I know -- is there a way to
16 know in a given lamp what company's LEDs are actually in
17 that lamp, or sort of, you know, the spec is on the
18 package and everything, but this sort of enforcement
19 kind of compliance stuff in this particular marketplace.

20 I guess I'd like to get your comments on what
21 that looks like, sort of practically speaking.

22 MR. TROTT: Sure. So, there are some companies
23 who providing branding on their products to say whose
24 LEDs they choose. Some do it and some don't.

25 You know, I think the good thing is that there's

1 a number of programs that, quite frankly, have been
2 spearheaded by the Department of Energy, which do give
3 some protection. Lighting Facts, for instance, you
4 know.

5 And really, probably the biggest one really is
6 Energy Star and the testing that's required. It's been
7 referenced a couple of times. You know, it's a bit of a
8 hindrance because you have to ship your lamp off to a
9 lab and then wait 3000 hours and then 6000 hours to be
10 able to put the Energy Star label on it.

11 So, really, to me that is a pretty big one, the
12 protectant. If that helps?

13 MR. FLAMM: So, the two people on the phone
14 would like to speak again. So, Alex, do you want to
15 speak again?

16 How about Jim Gaines, are you ready to speak,
17 please?

18 I'm not sure if it's technical difficulties or
19 they're not available right now.

20 Are there any other comments in the audience?

21 MR. VAUGHAN: Hi, my name's Peter Vaughan. I
22 work for a semi-conductor company, one of many who make
23 drivers for the LED lamps, themselves.

24 And I have a specific comment about the
25 specification in terms of startup time. I notice the

1 California specification has a one-second startup time,
2 which is the same as the current Energy Star draft.

3 I see no reason, technical reason why that
4 couldn't be much shorter. I think Gary, from Cree, made
5 the same comment. You know, half a second, quarter of a
6 second.

7 And again, anecdotally, you know, one example,
8 you're walking up to your front door, you have a motion
9 sensor, a second's a long time. You know, to the
10 consumer it feels like a long time. You know, the same
11 thing the garage, you're walking down the step, again, a
12 second's a long time. So, there's no reason that
13 couldn't be 250 milliseconds, 500 milliseconds,
14 something shorter.

15 So, thank you very much.

16 MR. FLAMM: Thank you.

17 MR. GREENBERG: Hi, I'm Richard Greenberg with
18 Southern California Edison. And I have a comment about
19 the -- about dimming. I want to echo what Gary
20 Fernstrom said, I think that there should be more
21 labeling requirements for dimming.

22 Rather than asking customers to go home and look
23 on the website, we know that most of the shopping of
24 light bulbs take place, the decisions take place at the
25 store, while you're looking at the light bulbs. And so

1 I think there should be better explanation on the
2 packages, especially if there's -- if they don't dim
3 well with the most common dimmers.

4 I also want to talk a little bit about efficacy.
5 And one of my -- one of the things that frustrated me is
6 that even before the spec was mentioned we couldn't tell
7 people that LEDs generally save more energy than CFLs.

8 And now, if the efficacies are going to have to
9 be less, it frustrates me more because now to educate
10 them properly we have to tell them LEDs will not save as
11 much money as CFLs. So, we've taken away one of our
12 strongest selling propositions.

13 And I like it to be considered that we increased
14 our efficacy requirements over Energy Star, even if it's
15 only by three percent, so that we at least have a story
16 to tell, other than it lasts a long time and it looks
17 nice, and it comes on right away and dims.

18 Well, so those are my two cents.

19 MR. FLAMM: Thank you.

20 MR. GAINES: Can you hear me?

21 MR. FLAMM: Yes, who's on the phone?

22 MR. GAINES: Oh, okay, this is Jim Gaines.

23 Sorry, I think I had a problem on my end.

24 I wanted to respond to the comments on the ADCRI
25 being the burden of proof for the lamp maker, but we've

1 had 80 CRI for years in offices without babies getting
2 sick, attributable to the lighting.

3 Also, there are many surveys of -- many -- at
4 least two surveys I know of, not counting the stuff we
5 know internally, where people have looked at many
6 different LED lamps, and in some cases they picked the
7 80 CRI lamp over the 90 CRI lamp.

8 I've included references to those studies in the
9 written comments I supplied, which are not on the
10 website, but just sent to Gary, and Gabe, and Owen.

11 So, I would say the burden is really more on
12 proof -- more on proving you need 90 than assuming you
13 need 90 if you're going to force that higher cost

14 I'd also like to remark to the Commissioner that
15 at Philips we do have direct experience with a near
16 California quality product side by side with an Energy
17 Star product, and we can give a lot of detail on that.

18 COMMISSIONER MC ALLISTER: That would be great.
19 I appreciate that and I would just -- I mean you
20 mentioned, you know, various kinds of data that you
21 have. I think it would be great to have as much of that
22 as you're willing and able to put onto the record into
23 the process, because I think that will help us make
24 better decisions and sort of vet these issues more
25 thoroughly, so I appreciate that.

1 MR. GAINES: How should we go about doing that?

2 COMMISSIONER MC ALLISTER: Gary, do you want
3 to --

4 MR. FLAMM: I'm sorry, I didn't hear the
5 statement?

6 COMMISSIONER MC ALLISTER: Yeah, if you could
7 just describe to the speaker and to the room how to --
8 what the process is for getting things on the record, in
9 this proceeding?

10 MR. FLAMM: Well, we've asked for comments,
11 written comments within two weeks. We just got those
12 comments from Philips and I don't recall if they were in
13 a format that was appropriate, whether they were just an
14 e-mail or whether they were in a letter.

15 But we're asking for comments within two weeks,
16 written comments.

17 MR. GAINES: Yes, yes, but I'm --

18 MR. FLAMM: Go on.

19 MR. GAINES: I'm talking about sharing sales
20 data that we wouldn't necessarily want to put on the
21 public record, just so you get some sense of real
22 experience with real products that are equal to the
23 California spec, except power factor or --

24 MR. FLAMM: Okay, so you already have the e-
25 mails of Owen, Gabe and myself, so you can just send

1 that information to us.

2 MR. GAINES: Well, I think we really should sit
3 and talk about it, not just throw it across the ocean,
4 across the country.

5 COMMISSIONER MC ALLISTER: I think there's some
6 conferring going on about the legal process because
7 Commissioner Douglas was saying here, this is her area
8 more than mine since she's a lawyer, but there is a
9 process here to ensure confidentiality, which she
10 probably knows more about than I do.

11 COMMISSIONER DOUGLAS: Let me -- Jared came up
12 to talk about it. But if you think that the information
13 might fit within the confidentiality provisions, then we
14 can provide confidentiality for some kinds of
15 information, but that's a determination made by the
16 Executive Director.

17 So, I don't know, Gary or Jared, if you want to
18 say anything more about that?

19 MR. FLAMM: So, let's discuss this offline and
20 see how we can coordinate this discussion with our legal
21 staff and our executive office on this issue.

22 MR. SAFARIKIS: This is Al Safarikis from Cree.
23 We'd been interested to understand where this process
24 ends up, because if one party is unable to share secret,
25 nonpublic data, we would also like the opportunity to

1 also share secret, nonpublic data. Thank you very much.

2 MR. FLAMM: You're welcome.

3 COMMISSIONER MC ALLISTER: I'll make a general
4 observation about -- and this is a spec, right, so this
5 is not a standard that we're developing, so this is a
6 different, considerably less formal process that we have
7 right now for the quality spec.

8 But in general, you know, we make decisions
9 based on the data that we have, and the record that we
10 have, and if it's not robust, as robust as it might be,
11 then we may be operating -- then we have that as the
12 record and we may end up with decisions.

13 So, you know, sometimes what might happen is
14 somebody who ends up not being happy with the outcome
15 has sort of not fully participated in the process. And
16 that's unfortunate because they could actually have,
17 potentially, gotten a different outcome or one that
18 they're more amenable to if they'd actually sort of
19 participated more substantively. And I know everybody's
20 busy, et cetera.

21 But, you know, this process really does depend
22 on participation and information from the parties, and
23 so I would encourage all of the companies that have that
24 kind of openness, and goodwill, and ability to get
25 involved to do so. So thanks.

1 MR. FLAMM: Before we move on, I had suggested
2 right before we started that we start looking at the
3 five topics one at a time, and in those subject bins,
4 rather than just evolve around.

5 Would the people with their hands up, would that
6 be okay if we started doing that, and would your
7 comments fit into that framework?

8 MR. FLAMM: Okay, Gary Fernstrom.

9 MR. FERNSTROM: Gary Fernstrom, representing
10 PG&E. I just wanted to make a quick comment on the
11 subject of power factor because it's been alleged on the
12 record that these things don't demand much power and the
13 power factor is, consequently, inconsequential.

14 That isn't the case. That power factor results
15 in losses, in building distribution systems on customer
16 side of the meter, as well as utility distribution
17 systems between the transformer and the meter, itself.

18 And if you have multiple products, electronic
19 nonlinear loads on a distribution circuit, the losses
20 don't add up arithmetically, but add up exponentially.

21 So, a power factor is important. Thank you.

22 COMMISSIONER MC ALLISTER: Thanks Gary. And on
23 that front it would be great to -- I mean the utilities
24 are obviously key players and actors here and, you know,
25 they should have harmonics on sort of how the different

1 distortion -- you know, all the power factors are not
2 created equal, right? I mean a .7 could take lots of
3 different way forms and how does that -- what does that
4 look like to the utility? That sort of information, I
5 think, is really important so thanks for bringing that
6 up.

7 MR. FLAMM: So, Alex, you have something to say?

8 MR. BAKER: Yeah, appreciate it, thank you.

9 This is Alex Baker, Global Standards Manager with
10 Philips Luminous Lighting Company.

11 I have two minutes of comments here. First of
12 all, thanks to the Commission for this opportunity to
13 speak.

14 As noted in the EPA's 2012 summary of lighting
15 programs, nearly all electric utilities and efficiency
16 programs in North America rely on Energy Star
17 specifications as the platform for their success.

18 It is this aggregation of these programs'
19 interests into one set of specifications employed across
20 North American which is largely responsible for making
21 it possible to have high performance lamps at reasonable
22 price points in the market.

23 Also, the vast majority of Energy Star partners
24 have expressed time and time again that the existing
25 Energy Star LED lamp spec, which EPA is currently

1 seeking to further strengthen, is a very high quality
2 specification and that produces specified to it are very
3 well-liked by consumers.

4 Reviewing the reference Section 10.4 of the
5 CPU's decision, the positions of the parties suggest
6 general support for Energy Star specifications and the
7 quality that they represent.

8 The discussion indicates the CEC should consult
9 CPA's Energy Star program during the process.

10 During my time at EPA managing the process to
11 develop the Energy Star lamps, Version 1.0
12 specification, we learned a great deal about what's
13 technically feasible and what's cost prohibitive at this
14 point in time.

15 So, I'm confident that the team at EPA has many
16 insights to contribute to your process, particularly on
17 the subjects of color consistency, color rendering and
18 dimming.

19 My questions is, beyond the CEC and its
20 consultants, who is concluding that Energy Star is not
21 good enough for California consumers and at what point
22 did CEC give up on just using the Energy Star
23 specification, itself, and trying to work with EPA on a
24 stronger Energy Star spec that the CEC could leverage?

25 There's plenty of reason to believe that

1 abandoning Energy Star will only lead to considerably
2 higher prices at the detriment of consumers and
3 achievement of the CEC's energy savings goals. Thank
4 you.

5 MR. FLAMM: Thank you, Alex.

6 So, if it's appropriate, I'd like to try, if
7 there's anything more to say, to go through the five
8 topics.

9 The first, I would like to see if there's any
10 comments on dimming and dimming compatibility?

11 MR. HOWLETT: Actually, included in this topic,
12 if we can tackle the issue of packaging because one of
13 the things we've written in the draft spec is that there
14 should be some indication on the LED packaging of what
15 dimmers that LED is compatible with. And I've received
16 some offline comments about the practicality of that, so
17 I'd be glad to hear some discussion.

18 MR. FLAMM: So, Aaron's got his hand up.
19 Can you speak into the microphone, please?

20 MR. FEIT: There's a meeting -- there's a
21 meeting, a technical meeting at the Energy Star meeting
22 in a couple of weeks on dimming. We're participating in
23 that and it's a meeting where we're going to be talking
24 about the dimming specifications and how they should be
25 put into the second draft of the Energy Star

1 specifications.

2 MR. FLAMM: Thank you, Aaron. Gary, do you want
3 to come up?

4 MR. FERNSTROM: Gary Fernstrom for PG&E. I have
5 nothing more to add on dimming, but I would like to see
6 a compatibility with occupancy sensors addressed.
7 Because in my personal experience the LED lamps I have
8 in my home do not work well with the occupancy sensors
9 that are easily accessible to me.

10 MR. FLAMM: Thank you, Gary.

11 Okay, let's move on to life and warranty. Any
12 comments on life and warranty?

13 MR. LOWE: I'm Ken Lowe from Visio. We make
14 televisions, not lights, so I'm just here to observe.

15 But about warranty, a five-year warranty is
16 going to increase the cost to the folks because the
17 manufacturer's going to have to reserve money to cover
18 that warranty.

19 And one thing that does concern me about
20 lifetime on lamps is we bandy around a lot right now
21 25,000 hours as being, you know, the absolute floor.

22 But to me it's not the LED there is the problem,
23 it's the driver that's inside the LED, because the
24 driver is essentially just a power supply and usually it
25 contains electrolytic capacitor and it's very, very

1 difficult to get an electrolytic capacitor to last that
2 long in a hot environment.

3 So, going for a five-year warranty means all the
4 bulks would be returned, as far as I can see, unless we
5 can improve the drivers. Thank you.

6 MR. FLAMM: Thank you.

7 MR. VAUGHAN: So, again, Peter Vaughan from Hair
8 Integrations.

9 As a driver manufacturer, you're absolutely
10 right about electrolytics, it's the difference between
11 out and out failure and the end of life.

12 So, what typically happens with electrolytics,
13 they dry out.

14 But what the consumer experience is isn't the
15 product stopping, the operation of the product isn't
16 abrupt, it just slowly fades out over time, you know,
17 that's one way of putting it.

18 Just like the LEDs, themselves, will diminish
19 their light output over time, the capacitor,
20 specifically, the amount of line frequency, 120 hertz
21 ripple will increase.

22 And again, typically a consumer doesn't notice
23 that.

24 Well, the flicker's at 120 hertz which, by the
25 Energy Star specification, there is no limitation. So,

1 if you saw it with 30 percent, even when you get to 100
2 percent ripple, the consumer typically doesn't notice
3 that.

4 And there are many other products that are high
5 reliability, TVs, PC power supplies, even cell phone
6 charges where capacitor lifetime isn't really too much
7 of a challenge.

8 The other interesting, the capacitor
9 manufacturers, themselves, are responding with 130
10 degree rated capacitors. And again, it's somewhat
11 dependent on the full factor of the lamp, so it's kind
12 of a complex situation. But it's not technologically
13 unachievable. Thank you.

14 MR. FLAMM: Thank you.

15 COMMISSIONER MC ALLISTER: So, Gary, you've
16 looked into this during the course of development of the
17 spec, right, the lifetime -- sort of technical basis for
18 lifetime?

19 I guess we kind of need to establish, you know,
20 whether there's a problem here with cost implications
21 and kind of what, including a certain lifetime floor in
22 the spec means for its, you know, adoption, or its being
23 able to drop in the marketplace. So, I think that's a
24 pretty important issue to dig into.

25 MR. FLAMM: So, I wanted to bring up that Energy

1 Star version 1 had a 10,000 hour life on the lamps. And
2 in draft 2 said 25,000 for res lamps and 35,000 for non-
3 res lamps, and a three-year warranty.

4 And so we went with their 25,000 hour that is
5 Energy Star and the five-year warranty which was more
6 than Energy Star, and that's where we got those numbers.

7 MR. FEIT: There are -- sorry. There are 8,000
8 hours in a year, so if you're saying it's a 25,000-hour
9 lamp and you're giving a five-year warranty, then all of
10 those lamps are going to fail.

11 So, my question is are you basing it on 24/7 or
12 are you basing it on three hours per day? As the
13 Lighting Facts label says it last 22 years based on
14 three hours per day.

15 But if you are insisting on a five-year warranty
16 and there are places where people put a light bulb in
17 and it stays on 24/7, like in hallways and garages, you
18 know, commercial hallways or garages, it will be an
19 impossibility for the lamps to last.

20 But you're right, they won't fail, they'll just
21 lose their 70 percent lumen maintenance, they probably
22 won't fail.

23 But I mean that's my question on your warranty,
24 what warranty are you talking about?

25 MR. HOWLETT: Okay, so this is Owen Howlett,

1 I'll respond to that one. The reason -- this is the
2 reason why we made the distinction in the spec between a
3 residential lamp and a lamp that's sold as being
4 "commercial grade."

5 So, because the commercial lamps are possibly
6 going to be on 24/7, if they're rating for 35,000 hours,
7 that gives them approximately a five-year life span.

8 With the residential lamps, we would expect them
9 to be used much less often, so even at a lower number of
10 rated hours they can still last for five years.

11 So, that was the rationale and we're looking for
12 input on that in terms of is that realistic?

13 I mean if the capacitor is going to dry out in a
14 hot environment, anyway, irrespective of whether the
15 lamp switched on or not, then if that's going to be the
16 limiting factor in the life of a lamp, then maybe a
17 five-year warranty isn't reasonable.

18 One of the reasons for five years, we felt like
19 anything beyond five years is meaningless. I mean,
20 really, who's going to return an eight-year-old lamp,
21 right?

22 So, we're looking for input on that.

23 COMMISSIONER MC ALLISTER: Okay, I guess I'd
24 like some insight on -- well, it would help inform this
25 discussion.

1 My understanding of those lifetimes, you know,
2 the estimated lifetimes, is that they're based on
3 probabilistic measures. So like, you know, sort of you
4 can expect that, hey, this lamp -- you know, the
5 advertising is this lamp's going to have an X year life
6 and then say there's no warranty, it's just like this
7 thing has an X year, you know, a five-year life. That's
8 based on a failure curve of some sort, I think, you
9 know, some percentage will fail by that time. And I
10 don't know if it's 10 or 20 percent, something in there.

11 MR. FLAMM: I believe it's 50 percent.

12 COMMISSIONER MC ALLISTER: Oh, is it that much?

13 MR. FLAMM: Yeah.

14 COMMISSIONER MC ALLISTER: Oh, is it 50, okay.
15 So, I guess, you know, we need to select the sort of
16 minimum warranty for the spec with that in mind, such
17 that it really is -- we're not eating too far into that
18 probability curve, so that it really is a failure that's
19 a failure.

20 MR. HOWLETT: Well, we also need to, maybe, in
21 this discussion tackle the comment that was made
22 earlier, I can't remember by whom, that manufacturers
23 don't want to market some of their lamps as commercial
24 grade and others as not commercial grade.

25 If the manufacturer's feel that is not a

1 practical approach to take, then we need to revise our
2 warranty requirement.

3 UNIDENTIFIED SPEAKER: Most people, commercial
4 and residential, buy from Home Depot or both.

5 MR. HOWLETT: Yeah, so irrespective of who --
6 irrespective of what application the lamp's going to be
7 used for it might be bought at the same retailer, but is
8 it practical to have some lamps marked on the packaging
9 as being commercial grade and some not marked as
10 commercial grade?

11 If that's something that is going to be too
12 confusing to consumers, or the retailers aren't going to
13 carry it, or the manufacturers it's too expensive, then
14 we should know.

15 COMMISSIONER MC ALLISTER: Well, it seems like
16 there -- isn't there industry standard practice there
17 already? If there's already those segments that are
18 operational in the marketplace then we should just use
19 them. But if not then it's --

20 MR. HOWLETT: But it's not common to have that
21 kind of labeling on the packaging at the moment.

22 COMMISSIONER MC ALLISTER: Okay, I understand.
23 So, I guess the question is that seems like a pretty big
24 lift to sort of push the marketplace into distinguishing
25 and I guess it would be -- we'd want people to -- we'd

1 want folks to chime and say whether they thought that
2 was useful, which is exactly what you're saying so,
3 yeah, I agree.

4 MR. HOWLETT: So, we're open to proposals.

5 MR. FLAMM: Well, Terry McGowen came up and said
6 he would like to speak.

7 MR. MC GOWEN: Yes, Terry McGowen, again, from
8 American Lighting Association.

9 I've heard this discussion and appreciate it,
10 but I think it illustrates a very important point about
11 this market that we're trying to transform.

12 This market is layered and it has practices at
13 some levels which don't occur very much at the other
14 levels.

15 And what we're really saying here, I believe, as
16 I understand it from Gary and others, is we're trying to
17 really make a difference in the market, rather than as
18 we did with CFLs, hit the bottom layer and maybe a
19 little bit higher than that.

20 But when I see the residential lighting market
21 as a whole, I see some products that are very high end,
22 very exotic, hand-built, custom-made, expensive, I see
23 products that are somewhat below that and, you know,
24 then I see way at the bottom some very low-cost
25 commodities that you go into a Wal-Mart, or Target and

1 you mix and match a shade and a stand, and so forth.

2 And I think you're trying to get them all.

3 And I think you have to be able, then, to
4 provide light sources that are capable of doing that.

5 And I don't think, if you're an interior
6 designer, or a picky homeowner who looks at different
7 colors on switch plates, that you're going to be
8 satisfied with something like a CRI of 80, when you
9 really want those differences to come out.

10 And I also point out from our experience, as
11 American Lighting Association, that what we do in
12 pioneering some of the high-end things, like dimmers, I
13 mean dimmers were at one point not at all common and did
14 not exist for residential lighting. You tend to get
15 those first in the high-end applications and then as the
16 market does its magic, you get lower cost products or
17 commodity products that make it a broadly-based
18 situation.

19 So, we are looking at this opportunity as a way
20 to perhaps penetrate the high end for the first time and
21 then let the market again do its magic and make these
22 projects available at the lower tier, more cost-
23 sensitive commodity rating where we'll really begin to
24 see the benefits of that transformation.

25 So, I would urge us not to shoot too low because

1 the risk is then we limit the ability to transform the
2 market.

3 COMMISSIONER MC ALLISTER: Thanks for those
4 comments. I have one question, actually. So, I think
5 your participation and your members' participation going
6 forward is going to be really valuable, partly for
7 helping us suss out the segments. You know, I don't
8 want to make Gary and the team's life too complicated
9 here because, you know, we're supposed to be focused on
10 these five items, and sort of getting those right, and
11 sort of focusing on, okay, what is the quality spec
12 going to turn out to be?

13 But what it turns out to be is really important,
14 as you said, in different parts of this marketplace.

15 So, any strategy for market transformation, or
16 whatever we're going to call it, has to -- I mean it has
17 to be a long-term strategy. It has to have milestones
18 and metrics along the way.

19 Given that you have fixture manufacturers and
20 you have sort of -- it sounds like your members sort of
21 run the gamut, sort of the whole ecosystem of lighting
22 in the residential sector, so I think you could be
23 really useful, and particularly your insight on consumer
24 behavior and adoption, sort of experiences with
25 different technologies to understand how this might play

1 out.

2 So, anyway, I just wanted to kind of thank you
3 for being here, again.

4 And I think the sort of near-term, you know,
5 we're focused on certain things in the near-term and it
6 may turn out to be a small part of the marketplace and
7 relatively high end, I don't know, but it may end up --
8 it may look like that for a while.

9 We need a strategy to get down market and, you
10 know, some metrics to see whether we're actually getting
11 there.

12 And, Michael, you might have some thoughts on
13 this, too. I mean you're pretty aware of the
14 marketplace and where technology, you know, might be
15 going and some other folks here, too.

16 So, anyway, I want to try to keep our eyes
17 focused on what we're trying to do with the spec, but
18 also not forget about the long-term kind of impact we're
19 going to have because there's a technological pathway,
20 but there's also a human adoption pathway and they have
21 to match up or else we're not going to get there.

22 MR. MC GOWEN: I appreciate your comments and I
23 certainly agree with them. It parallels our experience
24 that if we understand the customer it will go a long way
25 towards making the transition happen. And the

1 understanding of the customer, as is apparent now to us,
2 has been incomplete, so we have a chance to do a much
3 better job. Thank you for that.

4 MR. SIMINOVITCH: Commissioner, just to build on
5 your point, I think a large part of this whole process
6 is something we've not really talked about today a lot,
7 and that's going to be the process of actually doing
8 this.

9 And so once we actually get a specification and
10 we move forward on this is what happens relative to the
11 consumer? We're going to need to have a very aggressive
12 educational component and implementation process on
13 this.

14 If the homeowner's in a grocery store and
15 there's the juxtaposition of a California quality lamp
16 and a mainstream lamp, and if there's any kind of cost
17 differential there, and I think there will be a
18 significant cost differential for quite some time, the
19 consumer may make a poor choice, even with the idea that
20 the technology is readily available.

21 So, we need to help the consumer with a very
22 forward thinking, kind of educational program that
23 really takes us from a consumable to a durable. And
24 that's really I think what we're talking about here is
25 really a state of mind market transformation.

1 When people go into a store to buy a lamp,
2 they're buying something that's going to be there for a
3 very long time.

4 COMMISSIONER MC ALLISTER: Yeah, I agree. I
5 guess just from my own experience, you know, the 12 buck
6 LED, you know, that's out there now, that sort of
7 registers with me kind of not as a consumable, but as
8 investment, right.

9 MR. SIMINOVITCH: Yes.

10 COMMISSIONER MC ALLISTER: And so the \$35 one
11 certainly is an investment.

12 MR. SIMINOVITCH: Yes.

13 COMMISSIONER MC ALLISTER: So, I guess what are
14 those, you know, elasticity's going to be for different
15 kinds of consumers, and I don't think we really know
16 that.

17 MR. SIMINOVITCH: No, we don't. And we're
18 trying to look at those because for sure there's going
19 to be this discrepancy in the marketplace where a
20 purchaser is presented with, let's say, a \$25 lamp and a
21 \$15 lamp, and in that kind of relative they could very
22 easily make a wrong decision. The \$25 lamp may actually
23 be a better economical purchase for them than the \$15
24 lamp, or a \$20 versus a \$15.

25 The barrier there is going to -- we're going to

1 have to deal with that with education, because initially
2 there's going to be that barrier.

3 Now, my industry partners have indicated that
4 that price differential's going to come down over time,
5 but we need to educate our way there to overcome the
6 initial hump.

7 COMMISSIONER MC ALLISTER: Yeah, so I think
8 we've both been in this business for a while and trying
9 to figure out how to get market transformation. I
10 think, you know, that there's a wrong decision or I mean
11 a -- second guessing the customer's decision kind of is
12 a -- it's a little bit tricky to set it up like that, I
13 think, and so --

14 MR. SIMINOVITCH: So, as much time and effort
15 that we're putting into the technical portion of this,
16 we need a very significant sit-down on what is an
17 educational program and look at it long-term, and we
18 need to bring all the parties in this, because this is
19 where the heavy lifting is going to be, it's going to be
20 on the educational component.

21 The technical stuff, my partners tell me it's
22 coming like a freight train and we can do the high
23 quality stuff, the cost stuff will be there, but we need
24 to educate. That's really the hard unknown in this.

25 COMMISSIONER MC ALLISTER: Okay, thanks. Thanks

1 a lot.

2 MR. FLAMM: Mike McGaraghan.

3 MR. MC GARAGHAN: Hi there, Commissioner, I
4 wanted to get back to one of your questions about cost.
5 Oh, first of all, Mike McGaraghan, on behalf of PG&E.

6 We are looking at the relationship between some
7 of these parameters and cost. And I didn't present that
8 this morning because it's a complicated process and
9 we're not done with it. Also, because I expect the
10 manufacturers in the room are going to have the best
11 perspective, and I hope that we can hear from all of
12 them on their estimates of, you know, what this lamp's
13 going to cost.

14 The other reason is that it's changing so
15 quickly. So, you know, we're looking at summer 2012 and
16 looking at some of the cost parameters for each of
17 these. That might not make any more sense in spring
18 2013.

19 So, hopefully, the manufacturers that's one of
20 the things they're going to be providing data
21 confidentially, they can give some estimates on what
22 each of these things cost.

23 On warranty, our initial assessment of the
24 market was that there was not a great correlation
25 between cost and warranty. So, we're looking at that a

1 little bit deeper, now, but it seemed like, you know,
2 three-year, five-year, six-year, ten-year there wasn't a
3 clear relation to cost.

4 To get into warranty and correct me if I'm wrong
5 Owen and Gary, that seemed to be a really important
6 thing for this spec because of a lack of a test
7 procedure for early failure.

8 There are -- I'm sorry, not a lack of a test
9 procedure, but there's just too many. There's a million
10 test procedures for ways to stress a light bulb, rapid
11 cycling, high temperature, you name it, and every
12 different jurisdiction has proposed a different early
13 failure test procedure and I don't think there's an
14 industry consensus.

15 So, without an industry consensus on that,
16 there's no way to tell if -- even if the LED's going to
17 last 50 years, if the lamp's going to die, if the
18 driver's going to die in two years we wanted something
19 in the spec to prevent that.

20 So, you know, that's the role of the warranty as
21 I see it at this point in this spec.

22 That said, if the industry does come together on
23 an early failure test procedure for LEDs that would be
24 great. And I know there's various people working on it
25 so, you know, maybe that's something over the next

1 coming months that we can coordinate with various
2 industry groups that are working on something, and come
3 up with something as a proposal for California. That
4 would be a perfectly fine outcome, too.

5 On the test procedure issue, I'm going to go
6 back to dimmability, the first point we started on,
7 that's another one where there's not great industry
8 standard or consensus on the test procedure.

9 And Owen, as you presented it this morning, it's
10 left a little bit vague right now, open to
11 interpretation in terms of, you know, what is flicker as
12 we dim a lamp.

13 I would propose that that's not at all outside
14 the scope of the Energy Commission to propose a test
15 procedure for this spec that lamps could certify to.

16 I know there's various groups, Mr. Feit
17 mentioned there's a meeting already planned in two
18 weeks, on the Sunday night before the Energy Star
19 conference that's going to address that very thing,
20 dimmability and test procedures. So, there are these
21 efforts.

22 I think, again, that California has an
23 opportunity to propose something and put it out there,
24 and see if we can speed up that process a little bit.
25 If people don't like the proposal then, hopefully, they

1 can come forward. And that, you know, in some of these
2 meetings that are going on in the different parts of the
3 country will -- you know, the outputs of those will feed
4 into California's process, too, so that we can get a
5 dimming test procedure nailed down in California,
6 including a flicker component, you know, rather than
7 leaving it a vague sort of can you see the light flicker
8 sort of approach which, you know, as I think everybody
9 agrees, would be something to be desired.

10 I think that's all for now, thank you very much.

11 MR. IRWITZ: Good afternoon, thank you very much
12 for your time. My name is Lewis Irwitz, I'm the Energy
13 Programs Manager for Soraa, a California-based LED
14 company in Fremont.

15 I wanted to discuss a couple of things that I've
16 been listening to over the last several hours. And I've
17 listened to Mr. Feit and I've listened to Mr. Trott talk
18 about CRI, and efficacy, and one of the things that I've
19 been hearing is that the consumer can't tell the
20 difference between an 80 CRI and a 90 CRI.

21 I can tell you that that's not true, they can.
22 I'm a consumer and I can tell the difference.

23 Sir, you, yourself said that you were buying
24 LEDs and putting them through your house. And the ones
25 that you liked are the ones that you kept. So --

1 COMMISSIONER MC ALLISTER: I actually still need
2 to go back and see what the CRI is but, yeah.

3 (Laughter)

4 MR. IRWITZ: Let's hope they're 90 or better.
5 But color rendering is an important aspect. And having
6 a -- Mr. Feit is correct, if you put a spec out there
7 that says you must meet a 90 CRI or you will not qualify
8 is going to negatively impact the market, there's no
9 doubt.

10 It's going to significantly increase the cost of
11 the lamps on the market and consumers will not adopt a
12 technology as quickly as we would like.

13 One of the things that Soraa has proposed and
14 we've recommended this in the current draft being talked
15 about with Energy Star is creating a tiered table for
16 CRI and efficacy where the manufacturer can choose to
17 make an 80 CRI, a 90 CRI, a 95 CRI and that the
18 efficacies that are attached to each of those CRIs will
19 be tiered so that it actually will meet a specification
20 equal to what Energy Star would want to create for a
21 certification.

22 I don't know if this is something that
23 California would like to do, but I can tell you as a
24 consumer of LEDs, myself, and I've also participated in
25 numerous programs with SCE, with PG&E to test the

1 consumer marketability, LED transformation is coming and
2 it's coming fast. And the best way to spur that on is
3 to allow consumers a choice for what they want, but also
4 to educate them for the best way and for the best life
5 that they can have.

6 The quality of light is without a doubt the most
7 important component that we've seen lately.

8 Efficacy is important, but not as important as
9 quality. Thanks you.

10 MR. SMITH: Good afternoon, my name's Aaron
11 Smith. I'm an economist at UC Davis who's interested in
12 a lot of these issues.

13 One comment I have is I've heard a lot of
14 absolute statements about consumers prefer better
15 quality, other absolute statements that consumers decide
16 on price and they'll buy the one that's the cheapest.

17 And so I'd like to echo some of the comments
18 earlier about the need for experiments and research on
19 this topic. And we need research that doesn't just say
20 here are two bulbs, which one do you like better? But
21 we need to be asking questions in a way where we could
22 really learn about how much consumers value these
23 differences. If we're going to think about rebate
24 programs and other things, we need to understand not
25 just what do people like and which things do they like

1 better than others, but how do they -- how much do they
2 value those differences.

3 So that's, I think, one really important thing
4 that we need to do and we need to do it in a very
5 robust and serious way, that's not priming consumers to
6 maybe -- to maybe in the experiment to prefer one over
7 the other because they kind of know which one you want
8 them to like or whatever.

9 So, I'd like to definitely echo that request and
10 it would be something I'd be interested in being
11 involved in.

12 And the other thing about consumers' willingness
13 to pay for a durable versus a consumable good, we need
14 to think not just about, you know, sort of what's the
15 present value of all the energy savings that this lamp
16 would give you for the rest of its life, but how long
17 are people going to stay in their house? People are
18 probably not going to unscrew all the light bulbs and
19 take them with them when they move.

20 COMMISSIONER MC ALLISTER: If they paid 20 bucks
21 for them, you bet they will.

22 MR. SMITH: You think they will? And what do
23 you do with -- maybe. I don't know, I mean maybe.

24 COMMISSIONER MC ALLISTER: I did, actually.

25 MR. SMITH: Okay, well let's -- it would be good

1 to know how many people are like Andrew is.

2 Or renters, right, a high proportion of people
3 are renters, so that would be another way to put it.

4 COMMISSIONER MC ALLISTER: Yeah, I understand.

5 MR. SMITH: It's a deeper question. My only
6 point was to say it's a deeper question than just
7 thinking about which product has the lowest lifetime
8 operating cost? There are other things that factor into
9 an individual's decision about how --

10 COMMISSIONER MC ALLISTER: I absolutely. I
11 totally agree with you and I think -- I mean this is --
12 like I said, these are behavioral issues, they're not
13 just -- consumers don't do the net present value of this
14 investment. They don't know what that is, and they
15 don't do it, and we shouldn't expect them to do it. We
16 want to give them a product that they want to buy.

17 So, go ahead.

18 MR. SMITH: I was going to say and even if they
19 do, there are other external factors that might make
20 picking the smallest net present value bulb not the
21 right thing for a particular individual.

22 COMMISSIONER MC ALLISTER: Yeah, so I would
23 actually sort of comment that this seems -- I mean we're
24 kind of under the gun, you know, to get things moving so
25 the PUC can use it in their process so, you know, the

1 spec, itself, I think is important to get done and I
2 apologize for kind of getting us a little bit off track
3 here.

4 But I think this customer value -- this
5 perception of value and quality on the customer side is
6 super important to get that discussion moving as well,
7 because that's going to inform where we think the
8 marketplace is going to go.

9 And we, as regulators and this body here, you
10 know, we are not going to be the ones out there
11 manufacturing the lamps, getting them on the shelves
12 and, you know, deciding for consumers what they're going
13 to buy. The consumers are going to do that.

14 So, you know, I guess my -- so I would say this
15 seems like a right topic for like PIER funding, or
16 something, or EPIC funding, and maybe we could have that
17 discussion with that team and sort of see where it might
18 fit into the Investment Plan that was just approved.

19 In particular, you know, if there were any data
20 available to do some -- you know, that can serve as a
21 basis for some kind of a natural experiment, already,
22 based on sales that are happening now, do a hedonic
23 model, or whatever you've got in mind. I mean I don't
24 know, I'm just sort of throwing things out.

25 But if there's data, now, that we can leverage

1 to sort of shed some light on this issue, that would be
2 great. So, anyway, I appreciate you bringing it up,
3 yeah.

4 MR. SMITH: I'd certainly appreciate being a
5 part of that to the extent that I could.

6 And just one more comment, to the extent we're
7 talking about rebate programs, you want to think about
8 setting those up in an intelligent way as well so we can
9 learn something. Learning something about how well they
10 work, and what works, and what consumers value.

11 COMMISSIONER MC ALLISTER: Yeah, absolutely,
12 thanks for your comments.

13 So, are we scheduled to wrap up at 3:00 or --

14 MR. FLAMM: Right, or --

15 COMMISSIONER MC ALLISTER: Okay.

16 MR. FLAMM: We had the room reserved but, yeah,
17 we were scheduled to wrap up around 3:00, I believe.
18 Actually, around 2:00 wasn't it?

19 COMMISSIONER MC ALLISTER: Oh, yeah.

20 MR. FLAMM: Yeah, around 2:00, 2:30.

21 COMMISSIONER MC ALLISTER: Yeah, it looks like
22 people have arranged their travel already so, yeah.

23 MR. FLAMM: Yeah.

24 MS. PRESTON: Hi, my name's Kourtney Preston,
25 with Feit Electric. Thank you for your time and I won't

1 keep you long.

2 I just wanted to make a comment on behalf of
3 some of our retailers in terms of time frame. You say
4 it's a voluntary, but I want you to know that California
5 leads the charge for most of the utility programs and
6 retailers have become very knowledgeable in programs and
7 the California market impacts their sales nationally.

8 So, most retailers won't be able to carry two
9 different SCUs, one for California and one for the rest
10 of the nation, and I wanted to mention that and think
11 it's important.

12 And so if you could give us time to react to
13 these specifications, if they do go through, not only on
14 behalf of the manufacturers, but also our retail
15 partners. Thank you.

16 MR. FLAMM: Thank you.

17 MR. FEIT: Can I ask one question, one quick
18 question?

19 MR. FLAMM: One quick question and I believe
20 we're going to wrap it up then.

21 MR. FEIT: Do you have to come out -- do you
22 have to come out with a new spec? It seems to me that
23 you're looking to make the spec, while the Energy Star
24 spec --

25 THE REPORTER: Your microphone, please, sir.

1 MR. FEIT: Sorry. Do you have to come out with
2 a new spec? It seems to me that the Energy Star spec,
3 plus the new version of the Energy Star spec is a pretty
4 good spec and it seems to me that you guys are looking
5 for a new spec just to make California different.

6 And I would really like to see the dissatisfiers
7 in LED lamps with the Energy Star spec, because I don't
8 think there are any. I really don't. I mean and I'm
9 saying that based on consumer returns, that I know
10 exactly what we get in consumer returns because we get a
11 record, because we give credit to every one of our
12 retailers for every single return, so I know what the
13 returns are. And they're not there, they're well below
14 one percent, even when consumers are buying \$25 light
15 bulbs.

16 So, I mean do you have to come out with a new
17 spec? That's my question.

18 MR. FLAMM: Well, this is something we've been
19 working on for over a year. And you're right the Energy
20 Star spec wasn't where it needed to be. And, as a
21 matter of fact, it's still a draft version.

22 We're trying to affect utility rebate programs
23 at a very critical time when, as Michael Siminovitch
24 puts it, there's this freight train where LEDs are
25 moving really fast and utilities are, you know,

1 developing their programs for the 2013-2014 time line.

2 And we did look at the energy spec and we,
3 collectively, not just us, but everybody that's been
4 working together, Dr. Siminovitch and others, determined
5 that these five elements were not sufficient in the
6 Energy Star.

7 So, that's why we had the Energy Star Plus
8 approach is we really didn't believe or we don't believe
9 that Energy Star's gone far enough in these five
10 elements.

11 MR. FEIT: I understand that's what you're
12 looking for, you're looking to make a new spec and
13 that's what your job is to find a new spec, or the group
14 is there to look for a new spec.

15 But I wish you would really go out in the market
16 and see if the Energy Star LEDs, if there are
17 dissatisfiers there. Look at what's being sold at Home
18 Depot, look at what's being sold at Lowe's, look at
19 what's being sold at Wal-Mart as far as Energy Star and
20 LEDs, and find out the real facts based on if consumers
21 are returning that product and if they're happy with
22 that product.

23 And I think you're going to find that they're
24 happy with the Energy Star spec fine.

25 MR. HOWLETT: Well, just to give some kind of

1 perspective on that, having looked at the history of the
2 CFL programs, that's one of the disconnects that exists
3 in the evaluation data is that there is a certain
4 proportion of people who will say that they're perfectly
5 happy with CFLs.

6 And if you look at the responses from consumers,
7 quite a high percentage of consumers say -- if you
8 present them with the CFL and say does this meet your
9 expectations, is it good enough, quite a lot of them
10 will say yes.

11 A smaller percentage of them will actually
12 install it and still be happy with it.

13 So, there's a disconnect between that short-term
14 information of are people happy with the lamp, do they
15 return, and also what kind of people are they? You
16 know, these are first adopters, these are people who are
17 willing to spend 20 bucks on a lamp, which is not
18 obviously the whole of the market, right.

19 So, there's not necessarily a connection between
20 the buying behavior and the responses of that first wave
21 of consumers and the behavior of the rest of the hump of
22 the market, which is ultimately what we're trying to get
23 at. You know, not next year, or not the year after
24 that, but three years or five years from now.

25 So, I'm going to take a point but I'm --

1 MR. FEIT: At \$30 a lamp consumers will return
2 the lamp if they're not happy with it, first of all.

3 MR. HOWLETT: Right.

4 MR. FEIT: And second of all, we passed the
5 first wave, we're moving through the second wave. It's
6 gone from \$30 to \$15, and we're past the early adopters.

7 MR. HOWLETT: Yeah, so, obviously, it depends on
8 how you characterize the market. But the LED lamp sales
9 as a percentage of all lamp sales are still below five
10 percent, so we're still comparatively at the very first
11 part of that overall wave.

12 MR. FLAMM: Do we want to wrap up now?

13 COMMISSIONER MC ALLISTER: I have to head out,
14 but I think maybe you can give everybody a -- you and
15 Owen can give everybody a sense of what's coming, remind
16 everybody of comments and kind of maybe recap the
17 schedule for the next -- you know, sort of put this --
18 get it moving forward and get it to the end point.

19 MR. FLAMM: Sure thing.

20 COMMISSIONER MC ALLISTER: Thanks.

21 MR. FLAMM: So, we are looking forward to
22 comments from everybody. We're asking for written
23 comments within two weeks, so it gives us a chance to
24 digest them.

25 We will be listening to everybody and most

