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

In the matter of,	)	
	)	Docket No. 10-BSTD-01
	)	
Draft 2013 Building Energy Efficiency Standards Revisions for Residential and Nonresidential Buildings	)	

Staff Workshop

CALIFORNIA ENERGY COMMISSION
HEARING ROOM A
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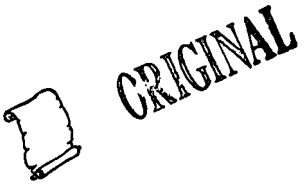

APPEARANCES

STAFF AND PRESENTERS

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Patrick Saxton

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Public Comment

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Cathy Chappell, Heschong Mahone Group

Mike Hodgson, ConSol, CBIA

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Mike McGaraghan, Energy Solutions

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P R O C E E D I N G S

AUGUST 23, 2011 9:05 A.M.

MR. SHIRAKH: I have this sign-in sheet here. I'm going to put it up there, if you guys kindly can either staple your business card or write your name and other information, I would appreciate it, so we know who's here.

There are copies of the agenda up there on the front desk, if anybody wants it.

This is Mazi Shirakh. To my left is Bruce Wilcox, Patrick Saxton and Martha Brook, and we're going to be making the bulk of the presentations today.

This is our last scheduled workshop for the 2013 standards before the draft standards are released. We have a number of topics today to be presented; the first one's going to be the treatment of photovoltaics in the 2013 standards.

And after that Patrick will present the builder supply, appliances.

And after that, about 10:15, John Proctor will talk about residential air conditioning refrigerant charge.

And about 11:00 Bruce Wilcox will be talking about residential mechanical ventilation.

And before lunch Gary Flamm and myself will be

talking about the administrative changes in the standards. These are mostly changes to the Sections 10-103 through 10-114.

And we'll also be talking about possibly changing the numbering of the subsections of the standards, so our familiar sections 150, 152, 153 and all that will be changing. And we'll discuss the reason why we're doing this and it's primarily because we ran out of sections in some of the subchapters, and we can't add more stuff to it, so we have to do something.

Then we'll break for lunch and after lunch Bruce Wilcox will be discussing the Reach Code requirements for both residential and nonresidential buildings.

And the last topic of the day will be ducts in conditioned space and John McHugh is going to make a presentation related to that, and this would be an alternative -- including an alternative package for residential buildings.

So, what's on the screen is the schedule that everybody saw last week and again, August 23rd, which is today, is the last pre-rulemaking workshop. By the end of September we'll be releasing the draft express terms, which includes the all of part 6 documents, which is the standards, the reference appendices in the ACM manuals.

And then we'll also be working on our Impact

Analysis Report, form 399, and other measures.

October 7th we'll probably hold an Energy Efficiency Committee Workshop and this would be, still, an informal hearing, it's mostly to let our Commissioners know what progress we've made so far and what we're recommending.

Other important dates would be December 12th is the -- this would be an Efficiency Committee hearings, which is this would be a part of the formal rulemaking.

And the adoption date, currently, is set for March 7th, 2012 at a Business Meeting.

So, if you have any specific questions about the schedule, I'd like now, would be happy to answer.

Martha, you said one item is missing from the schedule.

MS. BROOK: No, this is the right one.

MR. SHIRAKH: This is the right one. So, again, you know, you can look at it on your own and ask us any questions, if you want.

And so today is the 23rd, let's say how about September 10th, would that work for everyone?

And so I'm going to turn it over to Martha for the first presentation on photovoltaics.

MS. BROOK: Good morning. This is our -- a new area for the Energy Commission, it will be the first

time that we propose to include renewable energy systems in a code-compliance approach for the Building Energy Efficiency Standards.

So, our -- that is our goal is to introduce this option. The other thing that's really important to the Energy Commission is that we protect the thermal integrity of the building envelope, so we don't allow a PV system to result in a -- you know, to be used in compliance and to result in a building envelope that doesn't help us get to zero net energy.

So, our goal for zero net energy is to do everything possible to reduce the loads of these residential buildings before we focus on the systems to meet those loads and we don't want the -- any kind of a tradeoff, whether it's with efficiency or with renewable energy, to degrade the thermal integrity of that envelope.

And then the other goal for the Energy Commission staff is to keep the implementation of this option as simple as possible.

It will be -- our proposed approach is to have it a compliance option in the performance standards, so there will be no prescriptive way to meet -- to use PV as a credit to meet a prescriptive budget, it will -- it can only be used in our performance standard compliance

approach.

So, our proposal is to -- is that the -- you know, that we would model the expected energy performance, energy generation performance of the photovoltaic system in software using the CEC PV calculator that we use now for the new Solar Home Partnership Program, and we would allow that energy to be used to meet part of the performance standards calculated energy budget for the proposed building.

So, you know, we haven't settled definitely on these portions that we're proposing here but, you know, we'd like your input on where they should be.

We do need to constrain the portion of the energy budget that could be met with solar, again for the reasons I mentioned.

So, right now we're sort of setting that as less than or equal to ten percent of the performance budget, with the additional criteria that the thermal integrity of the prescriptive building envelope doesn't degrade more than five percent.

And so, then the other thing to mention here is that other renewable energy systems can be considered if and when they can be modeled in our compliance software, so we're not -- we have that ability now, with solar electric systems, and it's not that we're saying that's

the only renewable energy systems we'll consider, it's just the one that we can model now.

So, if and when other systems can be modeled on our compliance software, they could also be used for this compliance credit.

So, really, what we're really mostly thinking about is trying to allow the opportunity for production builders to use solar to meet a portion of their budget, you know, that's created when they don't have optimal orientation for their building, or if they want more expansive views in a certain direction and want more window area in a certain view, without -- but having some pretty strict backstops so that PV can't be used to really blow out all the efficiency measures that we really need to see in these buildings.

So, that's basically our proposal and we haven't -- we'll set up the detailed implementation steps in our ACM Reference Manual, and so it will just become part of the rule set for the performance standard.

And we're -- I think we're ready to open it up for comments, discussions, questions.

MR. RAMER: Thank you, Martha, Bob Ramer, a Senior Engineer with the California Building Industry Association.

We certainly want to see the details but as far as the overall goal here is we're very supportive of this. In addition to direct financial incentives, this provides us with another incentive option approach that can help us make the transition to a lot more use of PV, particularly in production housing. So, we think this is a very positive step by the Energy Commission.

Thank you. And we look forward to getting the details and to the extent it can be kept as simple as possible, we'd be very supportive of that. Thanks.

MS. BROOK: Hold on.

MR. SHIRAKH: We'll probably be working on this in the next few days, between next week and now, and we'll let you know about more details.

MR. RAMER: Uh-hum, just feel free to bounce anything off of us and, you know, ConSol will be providing advice.

MS. BROOK: Right. Well, you mentioned incentives and I think that's what --

MR. SAXTON: Yeah, I think right now the working idea would be that if you used PV as part of the compliance that that would probably not work along with the NSHP incentive.

MR. RAMER: Uh-hum.

MR. SAXTON: That you would have to still look

at that 15 percent beyond compliance without including the PV so --

MR. RAMER: This provides us with another alternative.

MR. SAXTON: Okay.

MR. RAMER: And, quite frankly, to some builders getting the new solar home money has been somewhat problematic, there's a lot of bureaucracy with that. This provides them with an alternative option that can be very useful, so we're very supportive of this.

MR. SAXTON: Great, thank you.

MS. BROOK: Thank you.

MR. SHIRAKH: Great, thank you Bob.

Mike Gabel?

MR. GABEL: Mike Gabel, Gabel Associates. So, when you talk about thermal integrity, you're really talking about all of the energy efficiency measures, including mechanical systems combined; you're not talking about just the envelope, itself, right?

MR. SHIRAKH: We're talking about envelope primarily.

MS. BROOK: So, that's why we sort of have two different criteria.

MR. GABEL: Yeah.

MS. BROOK: Everything that you just said would

be in the first bullet under the proposal, but there would be a separate criteria that you can't take all that away from the envelope.

MR. GABEL: I see. So, the ACM will have to be doing some kind of analysis to figure this out.

MS. BROOK: So, we sort of have this idea that there could be loads budget.

MR. SHIRAKH: Yeah.

MS. BROOK: I mean we're doing the analysis, anyway, to understand that, you know, on an hourly basis so --

MR. GABEL: So like Bob just said, I'm interested in the details a lot about how that's going to work in the ACM.

MS. BROOK: Uh-huh.

MR. GABEL: Because we don't want to sort of create some kind of inadvertent loopholes or strange scenarios.

MS. BROOK: Exactly, yeah. So, and go back to our third goal. Yeah, we know it's not going to be simple, necessarily, to implement, but that's still our goal and so we need to think about that, and talk about that with --

MR. GABEL: Yeah, and then also on implementation, you know, it's the same sort of issue

with F-Chart in solar thermal where closing the loop between what you specify in the drawings and what gets built, I mean you're -- there's a whole other dimension, now, to installation of a whole new feature, and just concerned about sort of putting all the pieces of the puzzle together in the field to make sure everything gets built, you know --

MS. BROOK: Right, right.

MR. GABEL: So, anyway, just --

MS. BROOK: Okay, great. Thanks Mike.

MR. SHIRAKH: Thanks Mike.

Mr. Keesee?

MR. KEESEE: Good morning, Mike Keesee, from SMUD. A question, would you be using the NSHP calculator to determine these TDV values?

MS. BROOK: Well, we were intending to use CEC PV.

MR. KEESEE: One of the things that we've noticed is that it overstates the production of the PV by about 30 percent versus monitored data --

MS. BROOK: Uh-hum, right.

MR. KEESEE: -- at least in the SMUD service territory.

MS. BROOK: Right.

MR. KEESEE: Is that going to be fixed?

MS. BROOK: Yeah, you're going to help us, remember? So --

MR. KEESEE: I was, okay.

MS. BROOK: Yeah, so I mean that's --

MR. SHIRAKH: You volunteered with time and money.

MR. KEESEE: Oh, that was -- that was Daniel.

MR. SHIRAKH: Oh, okay.

MR. KEESEE: Excuse me. Okay, I think we would be supportive of this. We'd need to see the details, as well.

I guess the thing that I would caution you is going forward I mean it's really, from at least my experience, is that the PV is offsetting your plug loads. That's the real issue here. It's not so much the thermal.

MS. BROOK: You're right.

MR. KEESEE: I mean it should be recognized as a peak saver --

MS. BROOK: Right.

MR. KEESEE: -- if it's done properly. But it really isn't and it really is more on the plug load side.

MS. BROOK: Okay great, thanks.

MR. SHIRAKH: Mike Gabel.

MR. GABEL: Mike Gabel, again. Something that Mike Keesee said a while ago and I've heard him speak to this issue, about once you have solar on the roof, solar PV, the perception of the homeowner is that they've got free energy and then their plug loads perhaps go up, and Mike has data on that.

I think you need to look at sort of what happens in the real world when you have PV, if that's actually going to drive loads up for some reasons then, again, getting back to the details of how much credit you're going to give for the PV I think is a key component of this.

MS. BROOK: Uh-hum, uh-hum.

MR. SHIRAKH: Cathy.

MS. CHAPPELL: Cathy Chappell, Heschong Mahone Group. Could you follow up a little bit on what Mike said, Mike Keesee, about plug loads and nonregulated loads; is that going to be something that's factored into this or are you still just looking at the regulated loads?

MS. BROOK: Okay. For this compliance option we're only looking at regulated loads. But Patrick's going to talk next about another compliance option that looks at builder-supplied appliances.

MR. SHIRAKH: Basically, the genesis for this

was to come up with some option to -- that can be traded off against the 20 percent overall glazing limit and the five percent west-facing glass, so that's what the origin of this was. So that only includes regulated loads, but that doesn't mean we can't think about plug loads in this.

MS. BROOK: So, then the only other thing I wanted to mention is that staff has been talking about this, you know, as an -- and a number of other people have, as well, and that -- you know, we've heard comments from you and others that if we -- if we're moving to zero energy, we do have to include consideration and incorporation of the unregulated loads.

And so that's really going to be something that we focus hard on for 2017 to really -- I mean we're trying to do little bits of that now as far as get a -- generating a whole house rating as a, you know -- you know, encouraging that and thinking about builder-supplied appliances.

But in the future we're going to have to figure out a metric that allows us to think about the rest of the house as we -- you know, as we go towards zero. And how we do that in a building standard is -- you know, it's going to take a little longer to figure out.

MR. SHIRAKH: Any other questions on PVs and standards? Anything online?

Okay, so we're going to move to the next topic and Patrick is going to talk about the appliances.

MR. SAXTON: This topic's actually very analogous to the PV approach, beginning to explore the use of high-efficacy light, residential high-efficacy lighting and builder-supplied appliances, so loads that aren't currently regulated in part six but are a significant source of energy use in the home, and is there some way to begin addressing those as we begin to think about zero net energy.

And it turns out there is quite a lot of energy potential savings there but, of course, it's not in the budget calculation right now and it makes it difficult to determine what amounts, again similar to the PV proposal, what amount of tradeoff should be allowed to occur and under what conditions.

As we started to look at this, we're trying to build off of the assumptions and usage schedules that are part of the HERS Whole House Program, and that's in Chapter 4 of their manual, and it actually has a table which will describe the hours under basically the duty cycle of the appliances.

And so we could get these savings into TDV. We

haven't done that, yet, so this analysis has all been done just looking at kilowatt hours.

Again, very similar to the PV proposal, how can we introduce these concepts and start moving towards addressing these loads, but not trade away too much against the building envelope?

So, the proposal would be that if all high-efficacy lighting and what appliances are supplied by the builder are Energy Star that you could apply about a five percent trade to the general budget. And that may, as we look at what appliances could be supplied by a builder under maybe an upgrade package, perhaps that number would change depending on the appliances that were actually in a home.

And we would use the constraint, the same constraint of no more than five percent trade against the envelope.

So, some details on what would be required and this is not a hundred percent finalized, either. But the permanently installed interior lighting would be high-efficacy with a vacancy sensor. This would be all the permanently installed lighting.

And to make sure that some lighting's actually still installed and it's not just all becomes portable lighting brought in by the homeowner, which has a more

probability to be low-efficacy, permanently installed lighting would be required in at least the kitchen, bathrooms, utility room and the garage.

Additionally, any builder-supplied ceiling fans would have to be Energy Star, with a light kit, which would have high-efficacy lighting there and offset the probability of someone adding incandescent light kit later.

And also along those same lines if this credit was taken, then ceiling mount receptacle or an empty junction box in the ceiling, where it was basically making provisions for the homeowner to add a ceiling fan would disallow this credit.

For exterior lighting basically the same approach of high-efficacy and controls, which could be either a photo cell or a time clock, or energy management control system that replicated those functions.

On the appliance side, really I think that the one appliance that’s almost always supplied by the building would be the dishwasher. And so to get this credit it would have to be an Energy Star dishwasher.

And then any additional appliances that were purchased by the homeowner in an upgrade package, or if it happened to be a community that the builder was

offering additional appliances as a standard feature, a refrigerator, a freezer, a refrigerator/freezer combination, a clothes washer or, again, ceiling fans those would need to be Energy Star rated as well.

Cathy had just asked about the plug loads. Certainly, everyone's aware that it's a significant source of end-use electricity consumption. Various plug load controls are definitely available in the marketplace today.

It's unclear how many -- you know, how often those are used. It seems that their penetration rate's quite low. And there is a proposal from the CASE teams to include residential plug load controls.

The Energy Commission has some concerns around compliance and enforcement because often those loads will not be there when -- because the homeowner hasn't moved in yet. And also some concerns around the persistence of savings because that's a hundred percent at the whim of the consumer's behavior, they could just unplug it from the controlled receptacle and use an uncontrolled receptacle.

So, for this proposal we're not including the plug-load controls, not including any credits, nor any requirements for them and that measure will be considered for the REACH package, for the REACH

standards.

And that's the end of what I have, so take any questions or comments, please.

MR. SHIRAKH: Any questions? Mike Hodgson.

MR. HODGSON: Good morning, Mike Hodgson, ConSol, representing CBIA.

Just a quick question on appliance package, just so I understand it, if we put in an Energy Star appliance in a production house, or any appliance we put in, all of them have to be Energy Star and we would get a five percent compliance credit. Is that correct?

MR. SAXTON: That would -- right now the working concept would be that it's bundled with the high-efficacy lighting.

MR. HODGSON: Okay, so you'd have to do both.

MR. SAXTON: You'd have to do both, right.

MR. HODGSON: Okay.

MR. SAXTON: So, right now the idea would be the high-efficacy lighting plus the dishwasher is -- I think that's essentially in a hundred percent of homes or close to a hundred percent of the homes.

MR. HODGSON: That's pretty much the only appliance that's being specked right now or being installed as a builder appliance.

MR. SAXTON: So that would be a -- that would be

a bundled requirement.

MR. HODGSON: Okay.

MR. SAXTON: And that would be a certain credit. And then possibly, if additional appliances were in an optional package, perhaps there's a different credit and that's a detail that we still need to address.

MR. HODGSON: I see. And then the lighting control credit, it seems like most of it seems to be a code, other than the controls for the outside lights.

MR. SAXTON: Yeah.

MR. HODGSON: And the vacancy control for the inside, so those would be the additional two things that you'd be asking for to get the credit. Is that correct?

MR. SAXTON: Yes.

MR. HODGSON: Okay.

MS. BROOK: If it's all -- it's all high-efficacy, right, isn't --

MR. SAXTON: Yeah, any -- it would be any permanently installed, any hard-wired lighting would be high-efficacy plus those controls.

MR. HODGSON: Okay, so in the kitchen for example, if you put in -- if you don't follow code -- or you follow code and put in an incandescent over the range hood, which is how we typically install it, then that would eliminate you from getting this credit?

MR. SAXTON: Well, yeah. So that might be a --

MR. HODGSON: Maybe we want to talk about that.

MR. SAXTON: That might be a lamp that needs to have some special consideration, perhaps.

MR. HODGSON: Okay, interesting ideas --

MR. SAXTON: But your overhead lighting in the kitchen, where you're allowed the 50 percent of the wattage to be incandescent would not be part of this package.

MR. HODGSON: I'm not too worried about those.

MR. SHIRAKH: Yeah, I don't the range hood lighting was every included in that.

MR. FLAMM: Right. This is Gary Flamm, I wanted to clarify that currently the range hood lighting is exempt from the standards.

MR. HODGSON: Okay. All right, so I -- it's doable. So, is it a graduated credit or are we just looking at five percent?

MR. SAXTON: I don't think we know yet.

MR. HODGSON: To be determined.

MR. SAXTON: Yeah, to be determined.

MR. HODGSON: Okay. Love to give you feedback on that and would like to include some plug load incentives because to me that's -- to us, I think that is a big issue.

MR. SAXTON: Okay.

MR. HODGSON: So, maybe we could look at the case study and see if there is something that's practical and enforceable because I share your concerns about enforceability.

MR. SAXTON: Okay.

MR. HODGSON: But plug load issue is a big one.

MS. BROOK: Is there any builder experience with plug load controls?

MR. HODGSON: There are a couple production builders right now that are coming out with, and I'm going to call it loosely, a green plug system. And it has an ability to turn off a certain series of plugs that are identified in the house that you would be using, or your children would be using for appliances. You know, it's not your refrigerator, but maybe your Game Boy, or it's your TV or that kind of stuff, and they're exploring those.

So, I think giving them an incentive to look at that, it usually -- it requires dual wiring, you know, multiple wire circuits, but may be something that, you know, I think we'd want to encourage.

MS. BROOK: Uh-hum, uh-hum, okay, thanks.

MR. SHIRAKH: Thank you, Mike.

Mr. Keesee?

MR. KEESEE: Mike Keesee, from SMUD; a couple observations and the like. If you're looking at the appliances, the two biggest ones that you need to look at are the clothes dryer and the electric range because those have huge peak implications.

MS. BROOK: Right, out of our control here.

MR. KEESEE: Every builder puts in a range, that I've noticed, or an oven of some sort, and they usually put in the 220 plug.

MR. SAXTON: I'm not sure what you're suggesting, Mike, that we would encourage gas appliances in those instances or --

MR. KEESEE: Well, you need to be aware of it. The real gorilla in the room, in my opinion, is the induction cook tops because even though they will cook food faster, they boil water faster for example, they have the same KW draw as typical resistance, at least from what I've seen.

MS. BROOK: Uh-hum.

MR. KEESEE: And that has real implications for zero energy going forward and it has real implications for the utilities in general because I'm not going to ask anybody to not cook between my peak period, in general.

So, it's -- I don't -- you know, it's a tough

one. I'm just saying it's something to be aware of.

MS. BROOK: Uh-hum.

MR. KEESEE: It's tough because on the other hand you might have AB 32 come down and say no more gas, right, and gas is more expensive and that's why the builders put in the 220 plug.

There may be some tradeoffs there, you know, there's been speculation that we've talked about internally about, well, we might give that plug away for the EV in return.

So, I'm just saying -- and it's the same with the dryer, the dryer is another -- again, the 220 typically goes in because it's a cheap -- it's a cheaper dryer for cost-wise.

In fact I was surprised in one of the projects I did, Premier Gardens, I think you guys helped us, there were easily half the people there had electric dryers. Again, you know, those are easier to control. I think it would be easier for utilities to come up with a demand response program that would reward customers not to use their dryer during the peak period because, well, you know --

MS. BROOK: Dry your socks at night, wasn't that a --

MR. KEESEE: Yeah, exactly. You know, people --

I think people would respond to that. We give them that message already. But I'm not going to tell them not to cook between 4:00 and 7:00, particularly with kids.

So, I'm just telling you these are -- you know, there's things I'm grappling with, with my program and just in general.

The idea of doing something with the plug loads needs to be done. I don't have an answer there, either. The green plug or green switch is a good idea, there are wireless ones out there, too. They're not necessarily inexpensive and the thought there is maybe you need to talk to the PUC, or whoever's running the demand side, the demand response programs that there might be some link there, that might be the way to do it. You know, and I know that's sort of out of the builder's hands because it's the homeowner that needs to make the agreement with the utility on a demand response basis.

But we did -- we've done things at SMUD, like our air conditioning load management program, that was a required part of our service that you had to install the ACLM switch.

And in fact people were automatically enrolled for some point, for some time under that program at SMUD. We've discontinued that at this point, but it may be worth discussing in the world of smart grid, and

smart meters, and so on and so forth.

I mean that is, I think, the implicit thought about what's going down with smart meter.

The last thing I would just mention here is that I have to discuss this internally, with our folks, but I think we would support a requirement that all the lighting be a high-efficacy, period, going forward. It's the easiest payback, there's lots of stuff going on with lighting, it's not as expensive as it used to be.

I think with the advent of the LEDs, in particular, in the next couple of years --

MR. SHIRAKH: Are you talking about the BAY standard or --

MR. KEESEE: I would make it just a mandatory requirement.

MR. SHIRAKH: We talked about this at great length with stakeholders and --

MR. KEESEE: Yeah, I would make -- I would make high efficacy -- I think we would be in support of that. I need to go back and talk internally. But I think my program experience is that high-efficacy lighting's there right now, there's no need not to do it.

And so there you go.

MR. SHIRAKH: Thank you.

MR. WILCOX: Mike, I have a question. The

internal gain calculation stuff that we're using in the residential programs now is based on the HERS stuff, and it actually has a whole system that does electric stoves versus gas stoves, and electric dryers versus gas dryers, et cetera.

And my question is are you suggesting that that should be a variable in the process here and that you would support --

MR. KEESEE: Well, what I'm suggesting --

MR. WILCOX: -- encouraging gas appliances?

MR. KEESEE: Well, the standards and the programs already do in many respects.

MR. WILCOX: Yeah.

MR. KEESEE: I mean -- what I'm suggesting here is that those two appliances represent significant peak demand --

MR. WILCOX: Absolutely.

MR. KEESEE: -- on a utility system. You know, if someone were to turn on all the burners on their electric stove at once, you know, you're looking at 10 KW of instantaneous demand or something going on. Heaven forbid they turn on the stove, too, during that peak time.

I don't know who would cook that way, but I'm sure it's been done. And they could have their dryer

going at the same time, for whatever reason; right? And a dryer has significant demand requirements, you know, an electric dryer.

So, if you're driving everything at TDB, which in my mind is peak demand, if we're going to get to zero energy, you know, I make -- I make the comments that we could do Japanese houses, which include all electric, except they don't eat at home. They eat out and they do everything off-peak because they're often on time-of-use rates that impact them, and I don't think their laundry loads is the same as Americans, as well.

So, I'm just saying it's tricky.

MR. SHIRAKH: Well, what if we had a requirement that they would need to provide a gas hookup and not electric, would that --

MR. KEESEE: Well, certainly, I'm just saying then you might run into AB 32 issues at some point going down the -- down the road.

MR. SHIRAKH: I mean as a credit, that's what I mean.

MR. KEESEE: Yeah, I mean that might be one way to look at it.

MR. SHIRAKH: Get a credit, that's what I mean.

MR. KEESEE: Could be. The problem is that, you know, the homeowner still makes the decision on what

appliance to purchase. And we were surprised, at least in that one instance, at the high incidence of electric dryers and I think it's just because it's a cheaper -- cheaper appliance and easier to hook up.

MR. SHIRAKH: Mike?

MR. GABEL: Mike Gabel, Gabel Associates.

So, this proposal would potentially be combined -- could be combined with the other one, under the same permit, right, you could do both?

MR. SHIRAKH: The other one, you mean the PV?

MR. GABEL: The solar PV credit.

MR. SHIRAKH: Yeah.

MR. GABEL: So, again, it's implementation with the ACM manual of figuring out not just independently how each of these is going to work, then when someone actually wants to put them together, like what really happens under the hood in the ACM in figuring that all out, you know, it's one more thing.

MR. SAXTON: Definitely something to figure out and the potential affect on the overall budget.

MR. SHIRAKH: Any other questions or comments on appliances, lighting? Anything online?

So, we're actually ahead of our schedule. I just want to warn everyone that we may be done before lunch, if we go at this pace. So, those who are

interested in the REACH standard topics, you know, you should stay tuned for the rest of this in case we get through the rest of the agenda.

So, the next topic is going to be the refrigerant charge and verification, and John Proctor is going to present that topic.

MR. PROCTOR: So, this is CEC staff proposal with modifications possible, originally sponsored by the case -- a case study. The study author is Bruce, myself, and Rick Chitwood.

This is the charge verification situation today. In the field there's a standard procedure that can be used above 55, as long as the indoor temperature is below 70.

There's a standard procedure, the same procedure can be used above 65 without restrictions on the indoor temperature.

There's a weigh-in method that can be used up to 55.

And how the air flow is determined to be correct is, in my opinion, not perfectly clear in the standards, even though I wrote part of it.

You can also put in a charge indicator display. The downside of the charge indicator display is you can't find one for sale.

Right now Trane and American Standard have a machine out that doesn't use super heat or subcooling as its charge verification procedure and, therefore, there's -- that equating no way to install this machine in California.

And potentially, as different things come up, there are other machines that may have other methods of determining correct refrigerant charge that we currently don't handle.

Also today the air flow through the unit for the charge measurement can be measured by -- can be actually directly measured by three different methods.

Can you hear me okay?

MR. SHIRAKH: No, your mic's off.

MR. PROCTOR: Whoa. Okay, now I'm going to have to calm down a little bit here.

Let's see, so today the air flow can be verified by multiple direct measurement methods and also by the temperature split method.

The temperature split method is controversial. The results are variable, it varies with the -- with the pieces of equipment you're using, with how you measure the temperatures, with the indoor and outdoor conditions. And there are a variety of suggestions out there on how to make it better.

And, basically, I'll show you on the next slide that, luckily, we probably don't have to worry about this because we're also -- it's becoming mandatory in this new standard that the unit has 350 CFM per ton through the unit already and, therefore, you don't have to measure airflow by some other method because you're already going to have to measure it by a direct measurement system or have an upgraded return system.

So, this is the -- basically, the proposal, to extend the use of the standard method for thermostatic expansion valves to a lower temperature, where the manufacturer agrees with that.

Secondly, to add a procedure that can be done down to 40 degrees where you -- where you restrict the amount of air leaving the condenser and, again, that's with the manufacturer's approval.

Clarify that weigh-in is acceptable. It's interesting, the changes I made in these slides aren't here but, okay.

The weigh-in method is acceptable basically at all temperatures. And the change that was in this slide, that doesn't show up here, is that it's available above 115, but I suspect it won't get used very often up there.

The charge indicator display, that the other

change I made in this slide is that the below 55, if you want to use a charge indicator display and have it verified by a HERS rater when the temperature is below 55, then it has to have a start-up self-diagnosis included in it to show that it's operational without the machine having to go on. So, there's a split at 55 degrees there.

The Trane and -- the Trane and American Standard Liquid Line procedure is specified for I believe 65 and above, and we're suggesting not only that that be approved, but it's something that they actually need right now because they, hypothetically, can't sell their machines.

And the last one is a methodology to approve other charge verification methods as manufacturers come up with different equipment that needs to be checked in different ways.

So, it's -- again, this is a slide that changed, supposedly. And, basically, since airflow is already determined adequate based on the mandatory 350 CFM per ton then the temperature split method is no longer needed. It gets rid of the variability and uncertainty associated with the temperature split method.

There are for options available, the prescriptive return duct system, which doesn't require a

HERS rater, and then the other existing, the three currently existing systems, flow grid, pressure matching, and flow hood.

This is some details on what you saw in the graph, the second graph or the second table that showed where we're expanding, the standard procedure and, also, providing alternative methods in order to cover a higher -- a larger number of possibilities.

Let's see. So, yeah, expanded use of existing methods and instead of weigh-in method up to 115 you can use it up to a hundred and -- or 365, I suppose, if you'd like, if it happens to be that hot out. I guess that would be serious global warming, wouldn't it?

The HERS verification, we would be widening the acceptability range for the HERS rater. Right now, because conditions change and instrumentation is, you know, not perfect you don't want to have a situation where the contractor goes out and does the job right, and the HERS rater comes out and says that it's wrong when it actually is right.

And so this widens the variance allowed by the HERS rater on super heat from six degrees to eight degrees, and on the subcooling from four degrees to six degrees, with the proviso that the subcooling is always greater than two degrees Fahrenheit.

Instrumentation issues; right now the sensor response is how the temperature sensors respond to changes in temperature. When you, say, start with them at, say, a hundred and -- 110 degrees, maybe, sitting out in the sun and you put it on a suction line that's running at 55 degrees how long does it take for it to respond to that and give you the right temperature?

That is actually changed from 15 seconds to 90 seconds because right now, sort of best case, there are very few temperature sensors that will respond that fast.

Pipe temperature sensors; there have been a lot of testing done on those. There's a new test for compliance that actually the pipe temperature sensors are tested on a series of different pipe sizes and are certified for the pipe sizes that they work on and not certified for the ones that they don't work on.

In the current standard we have hole sizes -- we have two holes in exactly the same place that are different sizes, so we figured maybe we'd fix that.

The saturation temperature measurement sensors are eliminated and there's a -- also a proposal to make an option of a pressure -- a saturation pressure measurement sensor to be permanently installed on the unit.

And specifying digital refrigerant pressure gauges because the field data shows that the analog gauges are very, very, very often wrong, they're out of calibration.

And if you want to use a refrigerant charge indicator display at lower temperatures, then you have to have self-diagnosis on the machine, on the charge indicator display machine.

And I actually said that in another slide, and that's it.

MR. SHIRAKH: I actually have a question, John. Would the CIDs work on the micro channels, the Trane and the American Standards?

MR. PROCTOR: They would work. The CIDs would work on any machine that uses either super heat or subcooling as the method of determining charge. They wouldn't work at this point on a machine that uses the Trane and American Standard micro channel methodology.

MR. SHIRAKH: So we need to clarify that.

MR. PROCTOR: Yeah.

MR. SHIRAKH: I understand that. My second question, is there anybody out there who's thinking about making a CID that would be available in time for the standards?

MR. PROCTOR: Yes, hypothetically, as it has

been for a couple of years. Supposedly, it's going to be at the big HVAC show in January.

MR. SHIRAKH: Good. Any questions? Anything online? We can have breakfast.

Okay, so we're going to move to the next topic, which is residential field verification and diagnostic testing for mechanical ventilation.

MR. WILCOX: Okay.

MR. SHIRAKH: Is John McHugh going to be here, do you know, before lunch? All right, thanks.

MR. WILCOX: Okay, so I'm going to talk about this topic, which is kind of actually talking about the references in the standards to the ASHRAE 62.2 indoor air quality ventilation requirements, and also to field verification and testing for those requirements, and also to some details related to filters and so forth that are related to the ASHRAE 62.2 standard as well.

So, the three things I want to talk about here are the -- we're proposing to update the reference in building standards to ASHRAE Standard 62.2. We're going to add some new requirements for HVAC system airflow and filter labels.

We've discussed this previously but it relates, actually, to some of the new requirements that are in 62.2 as well, so I wanted to talk about them again in

that context.

And then we're proposing to add a requirement for field verification and diagnostic testing of the airflow for indoor air quality ventilation systems and for HVAC filter labeling.

So, the current, 2008 standards reference ASHRAE, ANSI ASHRAE Standard 62.2 2007, and so we've proposed to update that reference to the 2010 version of 62.2.

And I guess there's some outside chance that we might be able to update it to the 2013 version, but I'm still not clear whether that will be ready in time to be adopted when the standards are adopted, and I'm trying to check on the details of that.

So, the idea here would be to update to the latest version of Standard 62.2 as part of this standards update.

If we do the 2010 version of the ASHRAE standard, we will propose to also reference at least two addenda that have been adopted since that standard was published. Those are ASHRAE 62.2 addenda B and E, and I'll talk about those in a second.

Addenda B -- both these relate to filters and the filtration requirements that are in that standard.

Addenda B adds a second rating standard that's

allowed to be used. The current standard requires a MIRV 6 rating, which is using an ASHRAE rating procedure, so the Addenda B expands that to include ratings using the AHRI Standard 680.

So, this is intended to allow more comprehensive use of filter test standards, including this more modern AHRI Standard.

So, just basically expands the available filters that can meet the standard.

And then the -- and then the E has to do with pressure drops. We've gone round and round about the pressure drop requirements in the 2007 standard and the requirement that you designed to meet that and all the problems that ensued from that.

So, the Addenda E is designed to change and improve that situation and it basically says that you have to design the system to accommodate the pressure drop as rated using the HRI standard which, in addition to a filter efficiency, gives you an airflow rating versus pressure.

So, it's finally bringing in the information that was missing out of the previous standard where it was -- it's been argued by knowledgeable people that it was impossible to meet the standard given the information that was available.

This standard also -- this Addenda also requires that the filter locations be labeled with the design airflow and maximum allowable clean filter pressure drop, and that that should be visible to the person replacing the filter.

And this is basically very similar to the proposal that we discussed when we presented the airflow and fan watt drop topic to have labels on filter grills that help people understand what kind of filters should be put in for those -- for those systems.

So, this is all consistent, we're all moving the same direction here, I think, to try and get a system that works better and is better maintained over the life of the system so that we can maintain airflow and filter efficiency.

So, the proposal for the California standards that's related to this is basically along the lines that the contractor shall label filter grills with required airflow and pressure drop information. The details of what that label would look like and exactly what it would say is yet to be determined, but that's something that's going to be worked on in the development of the language.

Then that the contractor installs filters labeled by the manufacturer for efficiency and airflow.

Remember, we discussed this one, also, at the airflow and watts workshop and in the context that the building standards don't really have any ability to regulate filters sold in the open market. We're not doing appliance standard here, we're only doing a building standard.

But what the building standard I think can do is insure that the initial filters that are installed by the contractor meet the requirements in the standard and then that, potentially, will be an incentive for people to provide label filters in the general market.

So, this requirement would say that a contractor has to installed filters that are labeled.

Point three here says that the filters that are installed has to be consistent with the required airflow and filter grill labels, so the whole system has to be done right, and that there be a HERS rater verification of this filter labeling and the filter installation at the time that a new house is finaled.

So, that's the proposal is that we'd include -- we'd make this whole system work, you have to have labeled filters, you have to have labeled grills, you have to put in the filters that match the labels and it's going to be a compliance variable that's going to be verified.

Okay, so the other new test and verification requirement that we're proposing here is to -- has to do with the airflow that's actually delivered by the indoor air quality ventilation system.

We're requiring continuous mechanical ventilation or, basically, to meet Standard 62.2 and that -- you know, those CFMs are calculated by the ACMs, and so forth.

The new thing here is to have that -- have a post-construction test by the contractor, which is so the contractor puts the system in, he verifies that it works right by measuring the airflow. Then a HERS rater verifies that the contractor did that measurement correctly.

And the proposal here is that that would be done with the normal sampling rules and so forth and, again, the detailed procedure and equipment to be determined.

So, in the past this was a -- you know, in the 2008 standards we did not propose to do HERS verification of indoor air quality ventilation partly because it would have been a first time that it would have been a measure to require a HERS rater at every house, in principle.

But now, since we're requiring several mandatory measures that require HERS ratings, the idea here is

that this is not going to cause the -- be the measure that requires the HERS rater to come out. And there's considerable thinking that installation quality is an issue with these mechanical ventilation systems and if you don't measure the airflow, you're not likely to get it all the time.

And since this is a health and safety issue, this is an important thing to verify.

The question marks there, comments by --

MR. SHIRAKH: September 10th.

MR. WILCOX: September 10th. Okay, that's the presentation. Question?

MR. SHIRAKH: Hodgson's closer and then Gabel.

MR. HODGSON: Thank you. Mike Hodgson, ConSol, representing CBIA.

I like the attempt at trying to resolve the filter label issue. I don't think it solves the problem. I mean I'm not sure what the restriction is in the State of California on not requiring filters to be labeled in the State, but that's what we need.

MR. WILCOX: It's the context, Mike, we just can't do that and it's part of the building standard.

MR. HODGSON: Okay.

MR. WILCOX: Okay.

MR. HODGSON: Well, until you do it what you're

going to do is say the filter has to be labeled.

So then the rater goes out in the field, filters aren't labeled right now and we all know that, and they're going to look and go, hum, the filter's not labeled, what do I do? Fail the house?

MR. WILCOX: Yeah.

MR. HODGSON: Well, that's not going to happen. So, I mean it isn't. So, the reality is that you got to label the filter. So, until you can label the filter and then you can check something against it, and John brought up -- John Proctor got up a very good point as to why does it have to be a HERS rater. A building inspector can do this, it's a visual thing. It's the same thing as an IC can for a light, just look and move on.

But until you can label the filter you're not solving the problem, you're just making another problem in my personal opinion. I think it's a good attempt, but it's not hitting the mark.

The augmentation of the ASHRAE Standard 680, which seems to be the -- really, what's gaining the momentum in the world of filters, is a really good idea and I presume that will carry through through the rest of the standards so that we're not referencing a MIRV 6, or it's a MIRV 6, or I'm not sure how that's going to go

through.

MR. WILCOX: Well, what the ASHRAE -- what 62.2 does is it provides an alternate rating that's consistent, supposedly, I mean it's argued the -- the argument is that they give you the AHRI terms that will give you the same filter efficiency as a MIRV 6.

MR. HODGSON: Yeah, but I think in the Title 24 it specifically says MIRV. And I just want to make sure where it says MIRV 6 in Title 24 that you follow through and make sure that this alternate is also listed.

Because we also will get stopped at the Building Department if we have an AHRI compatible filter that doesn't say MIRV 6, and it says in the code MIRV 6, then we're wrong and we need to fix it.

MR. WILCOX: Okay.

MR. HODGSON: So, still like to work on the label problem because it's a problem. This doesn't -- good idea, but we're going to get stopped in the field because of it.

So, until we can label filters, until we can figure out how to mandate filters to be labeled so that we can see what they are, we're stuck.

MS. BROOK: So, the thing --

MR. HODGSON: Tell us how to do that?

MS. BROOK: Well, we can be proactive. I mean

we're not -- we're not the Title 20 appliance staff, so we can't open a rulemaking and force filters to be labeled. But we can work with those staff to let them know that it's important.

The other thing we can do is be proactive in letting -- because we do have connections with this AHRI group of -- and the ASHRAE Subcommittee of Filter Manufacturers, that we could basically let them know that this is a requirement.

And we can also do the thing that we talked about, where we know all these filters do provide labels and get that information published on a Commission database, or website, and those kind of things.

MR. HODGSON: Well, have you recently looked -- I have not recently looked at the filter website, at the Commission, but last time I looked there were very few filters listed.

MS. BROOK: Right.

MR. HODGSON: And that's been, I think, the same thing for the last three years since we brought -- you know, we started the issue with the 2008 standards.

MS. BROOK: Right, right.

MR. HODGSON: And working with that committee, and I'm sure it's a great committee, but I still don't see a change in the market.

You go to the Homes or Lowe's, Depot, or the Slakey Brothers, and we have the same filters out there that we've had for the last five years.

MS. BROOK: Uh-hum.

MR. HODGSON: Now, they're getting better in quality because we are addressing the MIRV 6 issue, but it's really difficult to find the labels on them.

MS. BROOK: Gary?

MR. FLAMM: Gary Flamm, Energy Commission. There is a Title 20 Scoping Workshop on the 31st of this month and I think that would be a great topic for a number of stakeholders to bring up. And if this is basically a nonissue it really could, you know, sail through that process.

MR. HODGSON: We would stand right behind the Commission staff proposing that.

MS. BROOK: All right, we'll be there.

MR. HODGSON: Okay. Remind us and we'll be there, too. Seriously.

MS. BROOK: Okay.

MR. HODGSON: The other issue is measuring airflow of 622 fans. Great idea, should be done. The problem is not a lot of equipment out there that can do it accurately.

So, the flow hoods we use currently for

mechanical systems are not the right piece of equipment we have to use for this, and the HERS raters don't know that. I mean, they may --

MR. WILCOX: Well, as I said we're going to develop the rules for equipment and procedures for that.

MR. HODGSON: Okay.

MR. WILCOX: And that's definitely an issue. There is some special build equipment that I think works fine for exhaust systems, that's relatively inexpensive and easy to do. It's a little more difficult for some of the other stuff.

MR. HODGSON: Yeah. We've been measuring kitchen fan flows, ventilation flows for about a dozen years.

MR. WILCOX: Yeah.

MR. HODGSON: And you have to use a different piece of equipment and it's -- you know, for a rater it's another couple -- you know, a thousand dollars, or whatever, to carry this piece of equipment with them. But --

MR. WILCOX: There's a new set of equipment that's starting to come out, that's in basically prototype testing, now, that's powered flow hoods that are -- can measure accurately down to the levels you need.

MR. HODGSON: Okay.

MR. WILCOX: That will be on the market very soon. And it's kind of a -- for anybody that has a duct blaster, it's the same -- it's basically an add-on to a duct blaster, so it's not expensive.

MR. HODGSON: Well, I'd like to learn more about it. But that's -- it's a good idea we support it, but it's the -- the use of that type of measurement device is not widely held or done correctly.

MR. WILCOX: Right, yeah.

MR. HODGSON: I mean because I've seen them done with a flow hood and, boy, plus or minus a hundred CFM doesn't make a big difference there so --

MR. WILCOX: Yeah.

MR. GABEL: Mike Gabel, Gabel Associates. So, is combustion safety testing an integral part of this or is it kind of an adjunct, or what's not officially part of this test?

MR. WILCOX: When I wrote that I wasn't thinking about combustion safety testing.

MR. GABEL: Okay.

MR. WILCOX: But if there's a large clamor from those in the know who want to do that, I suppose it could be expanded.

MR. GABEL: Yeah, there's some local governments

that might be interested in that and I can talk to you offline about that.

MR. WILCOX: Well, Standard 62.2 has procedures for that.

MR. GABEL: Right.

MR. WILCOX: They're pretty simplified and but -- because I don't -- I don't know that that's a big issue. I'm just worried about getting the ADCFN that you're supposed to get and that's what this is aimed at for ventilation.

MR. GABEL: Okay, I can talk to you offline about that a little bit so --

MR. HODGSON: General information question for both Bruce and John. AHRI, I believe, had just come out with a installation standard which addresses combustion safety. Is that something that is worthwhile referencing? I think it was attempted to be referenced in the IECC and it's in the National Green Building Standards as a, you know, minimum standard.

And I was wondering, it's not my area of expertise, it's I think more John's, and I'm just wondering if that's a useful -- I'm not saying it's a requirement, but some type of protocol that could be referenced in the residential manual.

I'm curious as to whether you guys have reviewed

it. I think it was published last January in a fairly extensive consensus process. I can get you the --

MR. WILCOX: Yeah, please do. I'm not familiar with it, but we'll check into it.

MR. HODGSON: Okay, because it goes into all sorts of -- I mean it's national, so it goes into boilers and stuff that we're not too excited about, but it's an interesting -- I mean I like a consensus document that has quality control in it and that's what it's attempting to do, and I'm just wondering whether you guys have reviewed it. Okay, I'll send it to you.

MR. SHIRAKH: Thank you. Any other questions related to indirect quality? Anyone online?

Okay, thank you.

MS. BROOK: Maybe just remind people that you want comments, not by three question marks, but by September 7th.

MR. SHIRAKH: September 10th. And, hopefully, September 10th is not a Sunday, is it? Can somebody check that? It's a Saturday So, let's -- so September 10th is a Saturday, let's make it September 12th, which is a Monday.

So, this next topic is going to be changes to administrative code sections of the standard, a restructuring of the standards numbering system, the

prescriptive packages and the forms.

We actually have developed some draft language for these changes, but we're not prepared to actually show the changes because the enforcement unit within the Commission, they haven't had a chance to look at this and we don't have buy-in from them.

So, what we're going to present instead is kind of the high level, the ideas that we're considering. And, hopefully, within the next week or so, you know, we'll have the buy-in from folks within the Commission and we can release the language.

So, Gary Flamm and myself will probably be doing tag team on this one and Gary will start, and then I'll take over on the later sections of the presentation. Okay.

MR. FLAMM: Good morning. So, we're going to go over, as Mazi said, just a high level of what we're proposing to do with the Title 24, Part 1, Section 10 Administrative Code changes.

There are a number of staff that have been working on this, this is not just one person's effort. And I have the privilege of presenting for all of the staff.

So, as Mazi said, the language is not finalized and it has not been approved by management, yet, and it

has not -- we do not have a consensus in-house yet, so we're not ready to present that language.

So, we're going to present the key changes in each section and we're going to have the -- very soon, hopefully within a week or so we're going to have the language available for public review.

The first -- we're going to go through section by section in the Section 10, and so we're going to be adding and modifying definitions. In our proposal to have a alternate calculation reference manual we came up with a definition that's going to be in addition to the approval manual.

I'm not going to read these, but these are definitions that are either going to be added or amended in the standards. So, a lot of the -- the changes are -- there's a number of reasons for the changes that are being proposed by staff.

There's additional consultant work that we're trying to encompass. There's the -- there's an effort to make -- add more clarity. There's an effort to be consistent with other national efforts.

So, Section 10-103 is probably the section that has the most word changes. There's a -- and this is in response to some subcontractor work that is being done. Jeff Miller has been leading a lot of this effort.

The effort is to delete obsolete language, to reorganize and revise for improved clarity, to update references to the document registration requirements, to require document registration for nonresidential compliance documents, to introduce an option for document repository approved by the Executive Director, and a proposal to simplify certificate of compliance for some alternations.

MR. SHIRAKH: So, this last bullet that Gary mentioned, this came at the request of Tom Garcia and CALBO. It's basically this would be for residential alteration and some additions that do not involve a HERS verification feature.

In additions that are less than a thousand square feet basically we're allowing the building departments to come up with simplified forms, it could be just a check box. And we're leaving it up to them how they want to enforce it.

Again, this would be non-HERS verified measures.

MR. FLAMM: So, in Sections 10-104 and 10-105 there are no changes being proposed.

In 10-106, this has to do with compliance options. The Energy Commission does have a document, a compliance option manual that staff is also updating. And in updating that manual we found that there's some

clarity that needs to be added to Section 10-106. So, there's going to be some clarity added to this section for locally adopted standards and help alleviate some of the confusion about application requirements to the Commission.

Section 10-107, this -- Mazi, you added this, I believe. You want to --

MR. SHIRAKH: Yeah, this basically -- I mean this is not a new idea, but we're clarifying it. It gives the Executive Director the authority to approve a new protocol or a procedure which is equivalent to existing requirements.

And that we -- examples are that, you know, this morning we talked about refrigerant charge verification, but there are equipment out there that -- like the micro channels, for which we don't have existing protocols. So this would allow us to actually approve something without going through a formal rulemaking.

We have been doing this in the past, but this just codifies it, clarifies it.

Another example was, you know, the winter setup, you know, for the refrigerant charge where, you know, we don't have a procedure. You know, we came up with something, although it didn't work, we went through the procedure, talked with the stakeholders and if we had

consensus, we could have approved it. So, this is the idea here is to basically allow us to come up with something that's equivalent, not a new requirement.

MR. FLAMM: No changes proposed for 10-108.

Section 10-109 to include requirements for the application submittal and some clarifications to approve procedures for compliance software, alternative compliance packages and exceptional methods.

No changes proposed for 10-110.

Section 10-111 some new language for certification labeling of fenestration to include VT, visible transmittance.

No changes proposed for 10-112.

10-113, strengthening the language for reporting of roofing performance properties to the Energy Commission by the certification entity.

10-114, there are two requirements in 10-114. One is for the amendment -- the amending of outdoor lighting zones and the other is for local ordinances. Basically, that means authorities having jurisdiction that have minimum outdoor lighting levels.

That requirement for local ordinances is being removed because the similar language is being removed from Section 147.

So, back in 2005 when we first adopted the

outdoor lighting standards there were a number of concerns that the proposed -- the brand-new outdoor lighting standards would not be able to meet the local requirements for minimum foot candle levels.

And so an additional layer was offered as, okay, if you have a local ordinance, you can have this extra wattage.

And in 2008 we required local ordinances to certify that to the Energy Commission and nobody has certified it to the Energy Commission and so, therefore, we can only conclude that the extra layer is not needed. And, you know, my opinion is that the -- all of the allowances already will allow you to meet local ordinances. So, it was really, basically, a cherry on top of all of the outdoor lighting levels that you already get. So that's all being removed and it's been determined that that additional layer is not needed.

I'm going to let Mazi take this one.

MR. SHIRAKH: So, this is the restructuring of the subsections numbers. The problem we have here is there's a few places where we have actually ran out of numbers, Sections 10-10 -- 110 to 119 and 140 through 149. And so there's no room to add more sections.

And there is a proposal to have a mandatory requirement for nonresidential buildings and we don't

have a place to put them in the 140s. So, the idea is to use decimal numbering system in place of whole numbers in the main sections, but all the other conventions for letters, Roman numerals and other numbers would remain the same.

We've tried to do it in a way that kind of preserves some familiarity with existing numbering system, and this is not set in concrete, you know, we're open to other suggestions.

But here's an example where like Section 140 becomes 140.0, 141 becomes 140.1, and 142 becomes 140.2. So there is some familiarity, you know, those who know lighting is 146, indoor lighting/outdoor lighting is 147, there is some familiarity in there.

And so we will follow the same convention for other subchapters, like the residentials become 150.0, 150.1, 150.2 and there's really no limit how many sections we can add to it.

So, examples would be the Section 150(k)1 becomes 150.0(k)1. And 146(a)(1)(a) becomes 140.6(a)(1)(a). So, it should look familiar to people and I think it accomplishes what we're trying to do.

It's going to be a challenge to manage this through the compliance manuals and all of that. I don't think we have a choice.

The prescriptive packages, I think this has already been presented throughout these workshops and proceedings. The current -- the main package is called package D, there are no package A and B no more.

And both the CEC and the team are thinking about -- and I think the builders are very interested in having these alternative prescriptive packages. So, we thought it made sense to start fresh and not go from D to whatever. So, we're basically starting with package A and going to B, C, D and so forth. And I think everybody is on board with this.

The forms are not part of the standards, these are part of the compliance manuals, you know, it's not something we're going to do here. But since we're making changes to everything else we felt, you know, the numbering system for the forms appears like it was the result of a random number generator. We're going from CF-1R to CF-6R and back to 4R.

The simplest thing would be to actually make them sequential, CF-1R, 2R and 3R. There's also a suggestion to actually simplify the names, so that's just something we're putting out there on the radar.

And that's basically it. Any questions on --

Pardon me? Drafts for 10-103, we have -- I would say probably in two weeks.

Mike Gable?

MR. GABEL: Mike Gabel. So, there's one issue I'd like to maybe talk about at some point with staff. I've raised it in a letter, which is putting in the standards the fact that a permit applicant, at the request of the enforcement agency, would have to submit the ACM Input file, electronic file for enforcement purposes.

I think it's really important that the Commission set the precedent and the standards that someone doing plan review, officially, has access to those files, everything that they need including the drawings, including everything to do a full review and enforcement of the standards.

I think it's really important. Besides documentation, you guys are focusing on registry and documentation, which is good, but this other piece of the puzzle is really important so I'd like to see it get into the standards, somehow.

MS. BROOK: So, could it be that the plan reviewer just needs access to the registry? Why would it have to be a separate data submittal?

MR. GABEL: Well, I'm not aware that the intent was that the registry would hold the ACM Input Electronic files that run the calculations. If that was

your intent, then that's okay.

MS. BROOK: Okay.

MR. GABEL: But I'm really talking about making sure that somebody can get access to the file that was used to do the calculations.

MS. BROOK: Okay, good, uh-hum.

MR. SHIRAKH: Tom.

MR. GARCIA: This is Tom Garcia, representing CALBO, which is the California Building Officials Organization.

I just wanted to comment on Section 103 of the change. One of the things that -- the reason that CALBO is requesting this change is to encourage people to get permits. If we put too much paper out there, we discourage permits.

And so all we can do to simplify things and make it easy for people to come to the building department and get permits, we're better off.

So, my intent in the question is that we actually make the language say that CF forms are not required for a certain exempt thing, so that's the language that I'd like you to consider and I'll help to propose something like that.

Rather than saying it's up to the building department, because if every building department makes a

different CF, then the contractors are confused from jurisdiction to jurisdiction. So, if we simply say these specific items, since they're very clear in the standards, you can go to the standards and see what's required for a water heater installation, or for room additions less than 1,000 square feet, where you're using prescriptive paperwork, all of the documentation is already in the standards so CF forms are not required.

Is that clear or any questions on that? Great, thanks.

MR. SHIRAKH: There would be actually no documentation of any kind for --

MR. GARCIA: Because the standards already have the documentation within the standard. I mean the documentation is in the standards, so the inspector can go out and turn to a page in the standards and say, gee, this room addition needs this R value, this window, solar heating factor, all of these things are listed. It's a checklist. Why do we need forms?

MR. SHIRAKH: Well, this form could actually be just a checkbox, you know, this meets the statute --

MR. GABEL: Well, when we issue the permit the inspector's going to inspect it to the standards, the standards are clear and, therefore, we don't need forms.

If you have HERS raters' requirements then, obviously, you do need the CF forms. But for many places, many things that we do the standards are clear, already -- and just the fact that we issue a permit and inspect to the standards, we've complied.

MR. SHIRAKH: So, you're talking most about the res -- residential forms?

MR. GARCIA: Residential, yes.

MR. SHIRAKH: Okay.

MR. GARCIA: I don't see and maybe we could find places in non-res. I mean wherever we can do this we should be looking at it, and the CALBO Energy Committee will help to do that.

MR. FLAMM: Okay, so one of the constraints I believe with the non-res forms is that there has to be an engineer, a license person of record, who is putting their license on the line with a signature. And I don't imagine that that can go away, that requirement.

MR. GARCIA: Maybe not, but as I say, I haven't looked that deeply into the non-res. Okay, thanks.

MR. SHIRAKH: Okay, thank you Tom. Ken?

MR. NITTLER: Ken Nittler with Enercomp. On that issue of additions, a threshold of a thousand square feet sounds very high to me. That's an awful lot of space, sometimes that's more than the size of the

existing house, if it's an existing bungalow. So, I'd recommend a threshold much lower than that.

The other concern I would have is how this intersects with requirement for documents to get registered at a HERS provider and end up in the registry. You know, basically, we're moving to a world where every single permit needs to have registration because mandatory measures have HERS verification features. And so I don't understand, if you have no documents and there's nothing crossing the counter that describes what compliance methodology was used, what features are includes how -- what do you register?

MR. SHIRAKH: The requirement here is that for additions and alterations, and maybe you're right the thousand-foot is too big, but whatever that number is that does not involve the HERS verification feature.

So, if there is any kind of HERS verification -- and the requirement for registration --

MR. NITTLER: But how does that intersect with the registration requirement?

MR. SHIRAKH: The registration is only required for buildings or features that require some HERS-verified feature, so I think the two actually intersect.

MR. NITTLER: It's pretty hard to picture an addition that doesn't have a HERS verification

feature --

MR. SHIRAKH: Well, it has to be --

MR. NITTLER: -- so then it doesn't -- may not be addressing the simplification desired here.

MR. SHIRAKH: Yeah, I mean that's -- if there is any kind of HERS verification requirement, then it has to go through the whole -- so I think Tom's concern was mostly with like water heater change outs, or a window change out, that sort of stuff that's -- you know, that was the primary concern, or maybe a small addition. I agree, a thousand square feet is probably too large for this and we'll have a conversation with Tom about that.

Mike?

MR. HODGSON: Mike Hodgson, ConSol, representing CBIA.

The last slide you showed, Mazi, was on remembering the residential forms. I just want you to not take that lightly since a lot of us, including the HERS registry, which we're not, but have large databases, and we track things by names. And if we're going on existing subdivisions and you change the CF6R to be something else that is awkward.

So, before you make a change and I'm not saying you're doing it lightly, just check with the people who have databases that you're trying to manage and oversee

and make sure the impact is not insurmountable.

MR. SHIRAKH: Yeah, we're well aware of that and we are going to have a conversation with them. And if it turns out to be a big pain, we won't do it.

Jon, are you coming for your presentation or do you have a question?

MR. MC HUGH: Sorry I was here so late. Jon McHugh, McHugh Energy.

A couple of things that you had brought up on these changes, the first one is the VT rating and the NFRC has been aware of this for years. In fact there's been conversations going back to our early PIER project on skylights that NFRC does not allow in their database for VT, and does not allow the rating under NFRC 200 any product that is diffusing or nonplaner. And so, you know, skylights, which are kind of a big portion of the daylighting component of our standards fail on both counts in terms of NRFC.

So, I'd recommend that the Commission look at alternative rating procedures. And, you know, there's one, ASTME-972, but there's a number of different ways of doing that and I think that needs to be considered, otherwise you could end up inadvertently prohibiting all plastic skylights from the State, which probably wouldn't be a good idea.

The other thing is this whole idea of forms for retrofits. And, you know, when the forms are created people -- the authors working on that, in general, you know, have this mindset that it's a new building and you've got this voluminous set of forms. And I would think there's some advantage and it would be beneficial for all of these building departments and also would probably address some of the issues that Ken's brought up about, you know, consistent database formats so that we don't have a hodgepodge of information moving forward.

And as I remember, I'd done some trainings with building departments and something like, you know, two-thirds of their business is actually alterations. So, this -- you know, the issue about alterations is actually a big deal. There's a lot of paperwork that goes through. And to the level that we can automate this, make it electronic, make it actually, you know, the State can actually support these 500 plus various jurisdictions with a consistent repository and consistent forms, and streamlined forms.

So, yeah, for a roof, you know, should there be something, anything more than like a single page for some of these very simple things.

But, you know, we have -- like, for instance,

there's a lot of alterations that still involve tradeoffs. Hey, I'm just reroofing but, well, okay, what am I doing with the cool roof? You know, am I going to use the insulation tradeoff, et cetera or, you know, various different paths of getting there.

And then also, as we look at non-res, you know, the issue of responsible parties who have their licenses.

So, all that would imply that potentially we need a second set of forms which actually deal with alterations. Thanks.

MR. SHIRAKH: We actually have, from 2008 we have developed different forms for new construction and alteration, we actually have three sets, additions, new construction, and alterations, so we've actually done that. So, you may want to take a look at that.

MR. MC HUGH: Thank you.

MR. SHIRAKH: In order to simplify we actually added to the volume of the forms, which is kind of an oxymoron but, actually, it did result in simplification because of some of the things you've mentioned.

You know, they're just fundamentally different and requires different forms. So, hopefully, this form generator concept that you're working on will actually simplify this further so that the user doesn't even have

to know that these forms exist, and that by just answering the questions the generator will spit out the forms.

MR. MC HUGH: Thank you.

MR. SHIRAKH: Any other questions related -- again, for the 10-103 the biggest changes are the ones that Jeff Miller is working on, it has to do with the registries, the repository, the forms, the signature requirements. A lot of work has gone into and then, hopefully, we can release it for public review pretty soon.

Just because today is the last workshop doesn't mean we're not going to have public interaction. We're going to have stakeholder meetings, the groups will be meeting, conference calls and all that is still going to go one.

Sir? Yeah, could you please come up?

MR. WATERS: Thank you. I'm Mark Waters, from Special AC Pacific Coast Trane, and I'm representing Trane today as the Trane guy from Tyler, Texas couldn't make it.

So, I want to speak a little bit about the refrigerant charge position and actually ask if anybody has any questions regarding that as well.

The bottom line is I think the new process and

procedure that Trane and American Standard have developed far exceeds and makes it very, very, very much easier to accomplish what we're all trying to accomplish as far as the HERS raters and getting things done.

I'd like to at least see if we can get it passed so that we can run this as, you know, a trial process. And I'm not sure whether John's gone through this with you already, so I don't want to duplicate a bunch of stuff.

And I've been doing this for 40 years, myself, and when they came out and said, hey, we got a new process for this and we all kind of looked at it and hum, okay.

But as we have looked at the process more carefully, it's a very, very simple process. It's easy for the HERS raters to accomplish while they're on the jobsite. You know, no more looking up and trying to figure out what the subcooling or super heat properties are supposed to be like. And it's a matter of looking at a single charge, and there's two items to look on it, here's your line and it's supposed to be there and it's either temperature or it's pressure, and whichever one it hits first it's done, and it's over with.

So, I think if you guys will take a closer look at that, I'm sure you probably have, and some of you

know exactly what I'm talking about. I think it's a good thing and a good road to travel down so, hopefully, you'll adopt that as some language so we'll have a new and more efficient way of looking at things actually come to pass, and make it easier for our guys to do their job all the way around.

MR. SHIRAKH: So, John, do you have a comment on that?

MR. PROCTOR: Yeah, my only comment -- yeah, my only comment is that, yeah, I looked at it. I think we're really happy with it. My only comment is they actually need something to happen right now because they want to sell these things in California and I don't think they want to wait until 2014.

MR. WATERS: Yeah, thank you, John, and that's a good point. We are rolling down the road with the new process and we'll be using this process for all of our equipment.

We started with this new particular model, which is a -- it's our low-end line of the model, so it's the 13 seer type situation, which everybody's talking about and everybody wants to make sure we get at least 13 seer in. We're moving to the 14, which I'm sure probably California's moving to eventually, anyway. So, that will be something that will take place here shortly as

well, and I'd love to actually be able to sell these things in the State of California without having to really jump through a lot of hoops.

MR. SHIRAKH: Well, thank you.

MR. WATERS: Thank you.

MR. SHIRAKH: Of course, another thing we're really interested in, in working with manufacturers, is to come up with some procedures for low temperature refrigerant charge, you know, for cold months.

MR. WATERS: Yeah, you know, and I'm with you guys on that a hundred percent. I'm not sure where Trane, quite frankly, totally stands on that. I know that there was a little bit of a controversy there at one point but I'll tell you, I'm pushing that. I come from the refrigeration side myself, as well, so I understand how that works.

MR. SHIRAKH: Okay. All right.

MR. WATERS: Thank you very much.

MR. SHIRAKH: Thank you for your comments.

Any other questions or comments? Okay, there's an online comment. So, I think we've unmuted online, if you have any comments, please introduce yourself and go ahead and make it.

You're having problems, we can't hear you. Raise your hand or send a chat message. There doesn't

appear to be a comment. I can't read that. No, there's -- so, somebody's trying to speak, we can't hear you. What you may want to do is send us a chat message with your question and we'll read it.

It's Jamie Bacchus and George, I think, who are the ones trying to make comments. Please type in your message in the chat box and, you know, we'll -- you know, we'll try to respond to it. For some reason we can't hear you.

What we're going to do is get on with our next presentation and, again, you know, the commenters, please send us your message and after Jon McHugh's presentation, we'll go back to your comments.

Jon, are you ready?

Oh, I'm sorry. I'm sorry, Jon, it's not you, it's Bruce Wilcox, the REACH standard.

MS. BROOK: Okay, I'm going to make the first part of Bruce's presentation and he's going to follow.

So, this is Martha Brook and just to -- just to remind people what we're doing here for REACH Code, this will -- what we develop here and get adopted by the Commission will be placed into Title 24, part 11, in the voluntary appendices of the Green Building Standard.

The mandatory Part 11 Energy chapter will basically just reference Part 6 because the Mandatory

Green Building Standard is the same as our energy standard for -- you know, for -- that's the requirements.

But they do have a voluntary section of the Green Building Standard in Part 11 and that's where these REACH Standards will be placed in the Building Code.

So, for residential we're proposing a very -- actually, the first two bullets are the same as what's in the voluntary appendices now for REACH Codes. For energy efficiency it's 15 percent beyond the base standard for tier one and 30 percent beyond the base standard for tier two, and this is -- can only be implemented through our performance standard that will calculate the budget and calculate that you've met 15 percent better than that budget.

We're also introducing a few prerequisites, so these will be requirements. If you adopt tier one or tier two, these will be requirements.

And as I mentioned before, we want to encourage a whole house design, you know, a whole house energy rating. We're calling it a design rating because we want to clarify that we don't expect all the requirements of the HERS whole house rating program that's used for existing buildings to be necessary for

this. We want this to be really focused on the newly constructed buildings or, you know, major additions and alterations.

So, for example, the HERS whole house rating program requirements recommendations to be developed for improvements and we would not expect that to be a requirement of this design rating.

So, we still have to figure out what those specific requirements will be and we will be able to do that in our ACM reference manual, we'll be able to specify the design rating.

And also, the other thing that we'll have to do is coordinate with the Home Energy Rating System regulations that specify the whole house rating system and make sure that there's no conflict or confusion between these two ratings.

So, HERS whole house rating or HERS design rating will be required. We also want to set the quality insulation inspection as a prerequisite. We think this is, you know, basically just encouraging, you know, good builder practice and should be a requirement in all buildings that are trying to achieve advanced levels of energy efficiency.

And then similar to what Patrick explained in the builder appliance option, we would have a

requirement for high-efficacy lighting. It's the same requirements, hard-wired lighting and occupancy controls in all functional areas, plus Energy Star light kits in all ceiling fans.

There has been a lot of discussion about whether or not plug load control should be a prerequisite in the REACH Standard and so I'm mentioning that here so that we can maybe discuss it.

We're not -- staff isn't convinced it should be a prerequisite and, you know, it's really hard to say. Because in our -- sort of as we were thinking about what should be a prerequisite, we were basically trying to set the stage for what will be requirements in our base code in our next code cycle. That's sort of like, you know, a short list of things that we really want every building to do.

And we're not sure that plug load controls is far enough along in the market to have an understanding of market -- of, you know, consumer acceptance, how are people using plug load controls. We've never had them in our space standard before, even as a compliance option, so it would be a pretty big step to actually require it in a voluntary efficiency standard.

Only because, as many of you know, over 40 local jurisdictions are adopting these as mandatory in their

local jurisdictions, so that would -- we would basically be requiring all of these buildings to have a plug load control device without really the experience to know how much energy savings we're achieving with these controls, and what the consumer experience is with the technology.

But I'm happy to welcome comments to talk about that.

And then the other thing that we're adding as a -- it's not a prerequisite, it will be part of the performance standard implementation, we're going to include an energy budget cap for electricity consumption equivalent to, you know, in 10,000 kilowatt hours per year.

And the intent of this is to -- and I'm -- you know, we're not the first ones to acknowledge that -- acknowledge that an energy-per-square-foot metric that we use in our energy budget process makes it easier for large houses to comply than small houses, and at some point it seems inappropriate to just continue that trend line and not put a cap on whole house energy consumption.

Especially when, at this level of electricity consumption, the customers in these homes will be, at least in California, the majority of California will be paying high prices for electricity. And, you know,

that -- so it's very, very cost-effective for them to bring that consumption level down. And if that can be done in a regulated building standard, then that's what we want to do.

And this is similar to what -- there's a similar budget cap in the existing building HERS program, at 2,500 square feet. We're not convinced that a square footage metric is the right one for this budget cap because it really is about overall consumption and not just how big your house is.

But there are other whole house type of rating metrics that are starting to be used across the nation and, again, it just adds credence to this idea that we are, in the end, trying to conserve resources. And if we can -- if it's appropriate to do that and cost-effective to do that for large consumer -- you know, large amounts of electricity being consumed in these houses, then we want to address that and this is our attempt to do this -- to do that.

For nonresidential we've -- we're looking at a tier one level. Again, this would be implemented through our performance compliance software. A tier one level at ten percent beyond Title 24, Part 6, and a tier two level at 20 percent beyond Title 24, Part 6.

We're welcome to hear comments about these

levels of efficiency.

The reason that we're not going with 15 percent and 30 percent for nonresidential is that our 2013 -- our proposed update, as we've presented last week, we're expecting to get 15 to 20 percent improvement in our base code from 2008, and we've heard comments that 15 percent beyond that might be a really difficult bar to meet for the first step of a voluntary efficiency standard.

The only prerequisites that we're going to be proposing for nonresidential are process load specific. For example there's -- and I didn't have time to -- or room, it looks like on this slide, to include these.

Honestly, I just didn't have time to put them on there this morning. There is a supermarket refrigeration REACH requirement for secondary systems and there probably are other process load REACH measures that were proposed, you know, through the workshops we've had, starting in April, that we will gather together and add to the list of requirements for the nonresidential REACH standards.

And that's all we have on -- oh, no, sorry. So then the other part of this presentation is -- and the reason that Bruce is listed on the agenda is that we've done some work -- in order to land at that 15 percent

for tier one in residential, we asked Bruce's team to do some analysis to see can we actually meet a 15 percent better than our 2013 proposed standard in all climate zones.

And so Bruce is going to talk about options for -- that we think are valid and we will be encouraging to meet this level of performance.

MR. YASNY: Also, Martha, just to note to you and everyone online that the new WebEx version apparently is part of our problem. We are not seeing chat and we're not able to unmute, so we're going to work on that over lunchtime and see if we can fix that.

MR. WILCOX: Okay. So, as Martha said, I'm going to discuss some example measures that could be used for compliance at the REACH levels. And the basic agenda here is to show that they're reachable. I couldn't resist.

The caveat here is that this isn't, in no way comprehensive. We haven't tried to include everything and, in particular, we haven't included the things that were discussed earlier in terms of residential plug load controls or high-efficiency appliances, or photovoltaic systems, all of which may be part of this scenario.

And I haven't done any work on the nonresidential measures so that's something that will be

determined later.

So, what I'm going to show here is a series of measures and because we have some kind of -- you know, it's not just WebEx, there's a Power Point thing going on that every time I make up a slide it looks -- those headers look fine, they're all one line on my Power Point, on my computer, and then when we bring them here they all turn out to be two lines and half of them are hidden. So, we have to do something about this in the future here.

So, the basic presentation here and I'm going to go through this pretty quickly because it's really intended to give a concept, rather than details.

But the basic presentation is there's 16 bars here, one for each of the 16 climate zones, and then a bar to the right which is just for reference. It's weighted by the housing starts per climate zone that we've been using for all of our weighted results in the development of the measures for the standards.

And then the Metric on the left here is the savings compared to the staff-proposed base prescriptive standard.

And so for upgrading the ceiling insulation from R-30 to R38 in the climate zones -- so this is a general upgrade of the ceiling insulation measure.

So, in the zones where it's currently R-30, it would become R-38. Where it was R-38, it would become R-49, so we just simply upgraded one level.

And in climate zone one that saves about two percent of the base standard TDV budget, and that's the terms here. This is savings in terms of the base standard TDV budget, which is what's proposed to be the criteria for meeting the REACH Standard.

Martha said 15 percent savings and this is consistent with the percent savings I'm showing here.

And in order to build excitement, I've sorted these measures in order of average impacts, starting with the smallest ones going up and there are a dozen measures to look at, just to give us a view.

So, this -- you know, this is the smallest one in my group, it's a couple percent statewide. This is a -- if you reduce the duct leakage from the current eight percent assumption for the minimum prescriptive standard, if you cut that in half by doing a better job of duct leakage and use the low-leakage air handler, and measured four percent duct leakages, you know, that's also about a two percent effect. It's bigger in some zones and smaller in others.

And in general most of the measures that we're talking about here the impact is -- varies by climate

zone and that's for two reasons. One is that the loads, the usage of these ducts in this particular case varies by climate zone. And so in climate zone 15 it has an enormous and very long cooling season, so the duct leakage in climate zone 15 is a bigger issue than duct leakage in climate zone 7, which is San Diego, and 15 is Palm Springs.

Climate zone 7 is San Diego and the cooling season there is very mild and short so the leakage has a smaller impact.

The second reason these things vary is that the base budget for the prescriptive standards that you're starting with varies by climate zone.

So, climate zone 15 has the largest total TDV budget and it's something on the order of about five times bigger than the climate zone 7 TDV budget. So, we're getting three percent savings by this duct leakage measure and in climate zone 15 it's actually, probably, 15 or 20 times as much energy savings as we're getting in climate zone 7.

But since the -- since our context here is 15 percent savings of TDV compared to the base standard, then it depends on what zone you're in how much energy that really is saving. Okay.

All right, so duct leakage a couple percent

item.

All right, so here's a -- a better air conditioner duct and fan system. This is moving toward much more what we would think about as an air conditioning system optimized for California climates compared to the minimum standard air conditioner that we're specifying.

So, this would say if you reach four -- if you met the criteria of having 450 CFM per ton of air conditioning airflow and used .45 watts per CFM to do that, rather than 350 CFM per ton and .58 watts, which is the base standard criteria, that this would be the relative savings and it's -- as you can see -- oops, let me move back, page down, page up. Okay.

So, again, climate zone 15 with the big cooling load has got the biggest impact where it reaches about three and a half percent or so on a statewide basis, where about two percent in the zones where the airflow stuff is -- or where the AC is least important, we get very little savings. Again, it's a big variation across zones and by climate.

So, we looked at increasing the thermal mass in the house. And, actually, what we modeled was doubling the sheetrock on the walls. I know there are some people who don't think this is a really sensible thing

to do but it's -- there are other ways to increase the mass as well. And so increased mass actually, interestingly enough, as you see, it has the biggest relative impact in the mild climate zones, which are all the climate zones 2 through 8 are on the California coast and that's where the impact is the biggest because that's the zones where you get typically big swings in temperature, and increased thermal mass helps in both heating and cooling, et cetera. And that's we're about three percent relative savings.

We've looked at glazing orientation quite a bit in terms of things that could be done to save energy. And this is proposing a -- using a reduced west-facing glass area and having six percent of the glazing facing north, east and south and only two percent of the glazing facing west. And that has a slightly larger impact, as high as five percent in climate zone 7 and about three percent or a little higher statewide.

If you get into this glass orientation stuff and it -- the question always comes out where do you stop? If you're going to tell people how to orient the glass, why don't you tell them how to really orient the glass.

So, this is sort of a passive solar version where you say, okay, we'll have two percent west, but then we'll make the south-facing glass ten percent of

the floor area, and put the other eight -- the remaining glass equally on the north and east sides. And, you know, that has a passive solar orientation stuff works, especially in the heating dominated climates, climate zones 1 and 5, and the cooler climates. But it's still -- it's a significant potential way to approach this REACH Standard I think in all the climate zones.

So, here's one that's -- tankless water heaters. The tankless water heater has an AFUE of .82, saves substantial energy in all the climate zones, and particularly in the mild zones where the heating and cooling is small. So, we get more than ten percent savings in climate zones 5, 6, and 7 out of just switching to a tankless water heater.

And this is the case where the savings from the tankless water heater varies a little bit from climate zone to climate zone because of the water temperature assumptions in the standard.

But you can, conceptually anyway, the -- I can't figure, I just wiggle this thing and it moves it. How do you go back?

Yeah, so this is one where the energy savings is roughly the same in every climate zone and you can see the relative size of the base prescriptive standard consumption makes the tankless water heater a big deal

in climate zone 7, where you can almost get REACH just out of the water heater, REACH 1, and much smaller in the inland climate zones where there are big cooling loads.

So, there are at least two or three versions of ducts and condition space in my presentation here. This is just warming you up for Jon McHugh's presentation, which follows.

This is ducts and conditioned space in the case where you have the furnace in the attic. The attic is covered up by the flag there, sorry.

And so this is the version, this is the requirement for the ACM rule that covers the case. You have your air conditioning coil, and your supply plenum and your furnace in the attic, and the ducts are all -- you know, immediately dive down into conditioned space.

And the rules in the ATM manual say in that case you -- if you verify that the ducts are all located in the conditioned space, but you still have to then assume that the return leaks are in the attic, and you do have to do duct sealing and you have to account for that.

But, you know, if you do that you save significant energy between -- in most of the cooling climates between five and ten percent, seven percent on a statewide weighted basis.

And it's a big deal in climate zone 16 where it's cold and -- both cold and hot, and so forth.

So, we've talked quite a bit about conditioned attics and having a compliance option for conditioned attics, and I think we've worked out, at least for the moment, a pretty straight forward ACM approach for modeling conditioned attic.

And there are -- you know, if you assume that the conditioned attic house has the same leakage, overall envelope leakage as the house with the normal attic, which is what the assumption is here. You know, we're sealing the attic up enough so that the overall system ends up with the same ACH 50.

Then we can save a lot of energy in many climates here and that could be a significant measure.

One of the reasons that these savings aren't bigger is that our base case prescriptive standard has a whole house fan in climate zones 10 through 15. And there's no way to do a conditioned attic with a whole house fan of the traditional kind because the whole house fan blows air into the ventilated attic and that's how it works.

So we give up in this measure, the way it's analyzed here, we give up the whole house fan so that reduces the energy savings in these cooling climates 10

through 15. It's not an issue in the zones where we're not proposing to require whole house fans, which is all the others, 1 through 9 and 16.

So that, you know, on a statewide basis is about seven percent.

Night breeze is an alternative ventilation, cooling and ventilation system and so this measure is you use a night breeze system instead of a whole house system, and that can offer big energy benefits in the zones where it really works well. Particularly, right here in Sacramento, about 20 percent on TDV.

And, you know, it depends entirely on the climate whether a night breeze or whole house system, a whole house fan system really saves energy. And it doesn't work very well in the very hot climates because it doesn't cool off at night.

And it doesn't do anything for you in climate zones 1 and 5 where we don't have any cooling load to speak of, but it works pretty good in the Inland and the Central Valley climates.

Okay, so here's another big hit here. This is using an evaporative condenser air conditioning system instead of a normal air conditioning system.

There's a compliance option that was developed by FREUS and put in the standards prior to 2008, and

it's in the 2008 standards, and it allows compliance using performance for systems using evaporative condensers.

An evaporative condenser is essentially a -- you replace the normal outdoor unit on your air conditioning system with one that uses a water system to cool and condense the refrigerant. And it's evaporative only on the outdoors. There's no evaporative cooling of the house, it's just simply making the air conditioner more efficient.

And there are -- there's a system on the market --

MR. SHIRAKH: Like the FREUS system?

MR. WILCOX: Well, like FREUS. Beutler is marketing, what's it called, an Aqua Chill system and it's been tested in a couple of utility programs. Southern California Edison has done a bunch of testing on those systems and SMUD has had a pretty extensive program using the Aqua Chill system in a number of houses, and they are both reporting that these things save a lot of energy, seem to be reliable, seem to work well, and et cetera.

So, we think this is a real option for the REACH standards in -- at least in the hot cooling climates.

So, here's the other conditioned space duct

system. This is -- if you have an AC system that's all in conditioned space, so that you don't have your furnace in the attic, you somehow get the furnace inside the conditioned space and you do the duct leakage to outdoors measurement to show that you have essentially no duct leakage to outdoors, which this is a procedure that's defined in 2008 standards to get this credit, then you can basically -- or you have no duct system, you have an AC system that -- you know, a mini-split air conditioning system or something where you don't have ducts in unconditioned spaces, then that's a substantial credit in all the climate zones, particularly in the hot inland zones.

And so we're getting close to ten percent out of that one measure. And this is related, also, to Jon McHugh's presentation coming up.

So, the question is how do we look in terms of meeting that 15 percent REACH code threshold; do we have enough measures to do it? And so, you know, kind of just to look at relatively how we're doing in each climate zone, I added up the percentage savings from the measures that are actually -- that don't duplicate each other, we didn't double count here on this version.

I've been known to double count previously, including the one that I posted yesterday, but this one

we fixed.

And so we're getting -- except for climate zones 1 and 5 we're getting -- you know, all of these climate zones are at least twice as many measures as you think you would need to reach that 15 percent.

And so even given that they're going to interact with each other and the total savings will be less than this simple additive thing, you know, things look pretty reasonable.

You have to keep in mind that the -- when you put a number of these measures together it's going to probably result in less savings than you get measure by measure. And that's because if you're going to do ducts in conditioned space and you're going to do an evaporative condenser, evaporative condenser efficiency is much better so you don't save as much on the ducts in conditioned space. And so the loads are smaller, so the evaporative condenser doesn't have as much work to do, so you won't save as much with that. So, the whole package will have less savings than this simple approach here.

But as a screen, I think this is relatively optimistic in terms of the 15 percent level.

MS. BROOK: Can you tell me, Bruce, what you mean when you said you didn't double count?

MR. WILCOX: I didn't count ducts in conditioned space twice.

MS. BROOK: Oh, oh, oh, oh, oh. Okay. But there wasn't --

MR. WILCOX: On good days I can figure out how to do that, how to not count that --

MS. BROOK: Okay, but there weren't any other conflicts as far as --

MR. WILCOX: No.

MS. BROOK: Okay.

MR. SHIRAKH: But this -- the interactive effects aren't -- haven't been taken into account?

MR. WILCOX: Yeah, these are not --

MR. SHIRAKH: So, it's going to actually be very significant, I imagine.

So, again, that would be September 12th instead of the 10th for the comment.

MR. WILCOX: Okay, so that's the presentation, I'll be happy to answer questions.

MR. RAMER: Thank you; Bob Ramer, with California Building Industry Association.

A couple points, going back to Martha's comments on plug load. We certainly are very supportive of seeing various plug load initiatives being brought into the standards.

The problem here is making it a prerequisite, as you well know, there's very little familiarity throughout industry with this right now. But this is definitely an area that we've got to get a handle on and get a handle on it quickly.

So, to the extent that compliance options, be it with the standards, themselves, or with the REACH 1 and REACH 2, it would be very useful.

I just don't think when -- you know, part of the problem here is you're producing what jurisdictions can adopt relatively easy and one of the odd things that we've seen over the past couple of years, with the advent of Cal Green, is that jurisdictions will adopt Cal Green minimum and then go, boom, right to a 15 percent set of energy codes increase, without really looking at what that means.

MS. BROOK: Uh-hum, uh-hum.

MR. RAMER: And so I suspect that if you just simply put this in there as a prerequisite, it's quite possible that you could have adoption in jurisdictions where this doesn't get much, if any, discussion at all. It could kind of float through and then they find out, gosh, we have a problem, we can't get our hands on this stuff, we don't know how to deal with it.

And so there needs to be some learning curve

here but we don't want to, you know, pooh-pooh the idea, it's good, and so it takes the --

MS. BROOK: Yeah, and that's the challenge that we have because it's the type of technology where it does seem to the Commission staff that it needs to be mandatory. The problem with it being a compliance option is we have no way to value the savings.

MR. RAMER: Right, I understand.

MS. BROOK: So, yeah.

MR. RAMER: And, you know, some of the appliance efforts as opposed to necessarily plug load strategies, may be easier -- you know, maybe two percent for this, four percent for that and six, you know, on.

MS. BROOK: Uh-hum, uh-hum.

MR. RAMER: Anyway, kind of moving on, I'd like to for a moment go back to November of 2010, when we had sort of the kickoff workshop.

MS. BROOK: Uh-hum.

MR. RAMER: And at that point in time the Energy Commission was discussing the potential for a REACH 1 and REACH 2, but that is substantially different from what we're talking about right now.

MS. BROOK: Uh-hum.

MR. RAMER: At that time we were looking at having, perhaps, three different ways of calculating

cost effectiveness, and that for REACH 1 --

MS. BROOK: Uh-hum.

MR. RAMER: -- we'd be looking at economics based on equal sharing of costs, reduced carbon with future generations.

MS. BROOK: Uh-hum.

MR. RAMER: And then REACH 2 would have been the zero net energy reg building.

MS. BROOK: Uh-hum.

MR. RAMER: Clearly, the Energy Commission has chosen to go with the 15 and 30 for residential.

To us, you know, we were very -- although we're certainly dealing with a very stringent set of standards and adding onto that of course creates design and cost issues.

There is a lot of sense in going with 15 and 30 because as you indicate, as you go to 2017 and 2020 there needs to be familiarity of where those next stair steps are going to be, and application of the REACHs could help that.

MS. BROOK: Uh-hum.

MR. RAMER: And what was being discussed back in November was going to kind of work counter to that. It was actually, in our view, it was going to scare people away from using it.

MS. BROOK: Well, let me -- just to clarify what we presented in November, it wasn't a different stair step approach, it was just a different valuation of the societal costs of energy.

And we are still going to help local jurisdictions, if they want to use either of those REACH TDV metrics for them to justify their own adoption of stringent codes, that's sort of really the reason that we developed those, in part was so that anybody adopting a stringent energy efficiency standard locally could have a basis for making the determination that it was cost effect.

And, you know, hearing that that's why they're doing it is because they're trying to have a local -- you know, have local action that really helps do climate change in a way.

MR. RAMER: Uh-hum.

MS. BROOK: And so having a societal cost of energy that really has a focus on climate change was certainly an intent of that.

But we also think it's very important that we've set voluntary standards that -- that have the ability to be judged consistently with our base standard, and that's why we're using the base TVD. So, in a way it's -- it puts a harder challenge in front of us. So, in

other words, either of the REACH TDV would make these things more cost effective. And we're not even, really, doing cost effectiveness right now.

MR. RAMER: I understand.

MS. BROOK: So, I don't think we ever intended to not do the stair step, but it was just a different way we were going to propose to look at cost effectiveness.

MR. RAMER: I appreciate that. The last sort of comment, the nonresidential versus residential; residential 2013 is looking at a higher level of increase in base minimum code. We're also looking at 15 and 30 as opposed to 10 and 20.

I'm not understanding why the difference for non-res versus res in both the mandatory standards and the REACH, why -- you know, we're all heading towards zero net energy --

MS. BROOK: That's right.

MR. RAMER: -- and I understand they've got a much longer date to get out there but, at the same time, depending on the commercial facility a 15 percent versus 25 percent increase in, you know, initial standards is significant. Why can't you share the pain?

MS. BROOK: So, I don't think -- I think we are trying to have equity and we need to -- we need to

figure out what that means. I mean it's a percent of a much different number. And we do have different zero net energy goals and residential is ten years sooner. And it's sort of the -- you know, the 15 and 30 for the two tiers allows us to set our next mandatory standard somewhere between there and still be on the path to zero the way that we think we need to be.

And for nonresidential we have six, rather than three code cycles and we potentially could do a 60 percent improvement over six code cycles with a ten percent difference.

And then -- and then again to -- it's sort of consistent with where we're landing on our update, we're getting between the 15 and 20 percent with the nonresidential standards and our tier sort of split that different between tier one and tier two.

But we do need to get more feedback from Savings by Design and other advance, nonresidential efficiency programs. So, let us know if that's not aggressive enough, then we need to know that.

MR. RAMER: I'm just jealous.

MR. SHIRAKH: And related to non-res and of the -- you know, the date is 2030 and I really think we cannot seriously talk about zero net energy about non-res without considering terminally driven chillers,

moving away from electric chillers, solar cooling and things like that. And we've had some discussions but because of the workload here we've been postponing it.

But I think after things wind down here we need to kind of go back and revisit those and try to create the conditions in the market for those technologies to commence in --

MR. RAMER: I agree, midrise and high rise are going to be huge mountains to cross on that.

MR. SHIRAKH: Right.

MR. RAMER: Lastly, we've kind of gone around on this numerous times, to getting back to plug load and other things. If we're going to get the cost of that PV system down, not only in square footage but in cost, we have to look at the unregulated electricity use of that house.

And we'll be very supportive of efforts that can kind of move us in a reasonable fashion to transition to that. So, to the extent we can do pilot programs with the Commission and any host of other things, we'll be up for that.

MS. BROOK: Okay, great. Thanks.

MR. SHIRAKH: Bob, while you're here, related to dryers, Mike Keesee's point, what about the compliance option for if the builder provides a gas hookup and 110

volt, no 200.

MR. RAMER: Uh-hum.

MR. SHIRAKH: And --

MR. RAMER: Right now I would like to chat with Mike, but I think the most common dryer that's going in is gas. And so I -- and I don't really foresee and AB 32 problem with that, if we're talking about residential, and that's one of the relatively few uses of gas in the house.

So, that certainly would be a viable option. For one thing consumers seem to like it and it would definitely help with his peak load issue so, yeah, we're up for it. Okay, thank you.

MR. SHIRAKH: Okay, thank you.

Mike Gabel?

MR. GABEL: I'm Mike Gabel, just to address one of Bob's questions. I mean we've done a lot of analysis at looking at reducing, you know, energy use below baseline for the 2008 standards, and when you get into commercial buildings, as a lot of people here know, it's a completely different beast.

And you have these very large ventilation loads and lighting loads that you can't get down below certain levels given the needs of commercial buildings, so it's just like in a different universe, but I appreciate your

point.

Question on the REACH Code. The tier one, just to refresh my memory, I think you said something about possibly not allowing the solar PV and high-efficiency lighting appliance options to be part of that or is that -- did I misunderstand that?

The understanding was you can use the potential other compliance options and actually have a building that thermally is below the Title 24, but you get to a REACH Code with solar PV and some other things?

MS. BROOK: Well, those are things we need to talk about.

MR. GABEL: Okay.

MS. BROOK: So, certainly, we don't want to -- just because somebody put in PV or builder appliances to meet X percent of the base budget doesn't mean we want to give them credit for the other part of those -- the energy use of those equipments for a REACH Code.

So, we need to figure -- we need to figure that out.

MR. GABEL: Okay, so staff hasn't really decide positively how to approach that, yet?

MS. BROOK: Right. So, you know, likely we would have those same options available to meet the REACH Code, it's just we can't be double counting that

credit.

MR. GABEL: Right. Okay, thanks.

MR. SHIRAKH: John?

MR. ARENTZ: John Arentz, AEC. I just had one general comment for the Commission staff, not so much on the residential and Bruce's presentation.

This is just an idea I had, so I'd like to see what people's thoughts are on it. But one possible prerequisite for non-res REACH could be certification of energy modelers because, as we know there's a lot of variation within the industry. And as we move towards multiple programs being able to be certified as compliance software, the problem's only going to get stickier.

So, you know, in the more extreme case you can have an energy modeler with maybe -- is inexperienced, with all good intentions, modeling some kind of a tricky system and ends up getting -- showing that it meets REACH when, in fact, maybe the building might not even comply with the standards.

MS. BROOK: Uh-hum. And so I know the ASHRAE Building Energy Modeler Certification, is there other -- are there others?

MR. ARENTZ: That's the main one that I know of. The last time I looked there's not a great number of

people that have the BEMP certification, but I think that's in part due to the fact that it's not really required anywhere.

MS. BROOK: Uh-hum.

MR. ARENTZ: So, if it were required by say for energy ratings or for REACH, then it could become more common.

MS. BROOK: Okay, thank you John.

MR. SHIRAKH: Pat?

MR. EILERT: Thanks. So, Bruce what are your cost effectiveness assumptions for all of these measures?

MR. WILCOX: Say again?

MR. EILERT: What are your cost effectiveness assumptions for all of these measures? Are you assuming that they're cost effective by climate zone?

MR. WILCOX: I haven't done any cost effectiveness calculations, yet. These are not argued to be cost effective.

MS. BROOK: So, these are suggestions for meeting a voluntary level of energy efficiency, so we didn't do the same level of rigor to justify it and also didn't do an integrated analysis for those measures.

MR. GABEL: Mike Gabel, just to address the question about certification of energy modelers.

MS. BROOK: Uh-huh.

MR. GABEL: So, the California Association of Building Energy Consultants, CABEC, is working on, with the Commission's blessing and the blessing of the IOUs, with the IOUs' support, a revisiting of the entire process of getting -- this is a voluntary certification program for people doing analysis. And it will be both residential and nonresidential.

And, of course, it won't be required, but it's a process by which we hope to show that there's going to be greater robust training and testing of people, which might result down the road of some other requirement, or prerequisite but we'll --

MS. BROOK: Okay.

MR. GABEL: -- we'll discuss that with you as --

MS. BROOK: Okay and are you considering something like a national certification to be equivalent or somehow get easier access into the CABEC certification?

MR. GABEL: Well, we're sort of looking at the ASHRAE thing.

MS. BROOK: Okay.

MR. GABEL: We're staying in touch with people who are familiar with it and sort of tracking it.

MS. BROOK: Okay.

MR. GABEL: And our understanding of it is it's still in the early -- the ASHRAE thing is still in the early stages as well.

MS. BROOK: Uh-hum.

MR. GABEL: And we'll be having more to say about that so --

MS. BROOK: Okay. Okay.

MR. HODGSON: Mike Hodgson, ConSol, representing CBIA. I want to visit the locally adopted section, which was actually a previous presentation, but it was mentioned also here.

MS. BROOK: Uh-hum.

MR. HODGSON: We're talking about trying to be similar and rigorous in our approach on either cost effectiveness or energy design and not double counting.

The impression I have or at least I think the market has of when you adopt a local code, and pass it as a local ordinance, all it has to do is arrive on paper to the Energy Commission and it gets approved. And the requirements and the rigor of which what is cost effective and what's not cost effective is moot, it's not even reviewed.

So, it would be interesting and I think appreciated if you did, in Section 10-106, talk and expand that language of locally adopted codes that

whatever local jurisdiction is reviewing those codes to go above code that use the same analytical and cost-effective techniques that are required by the Energy Commission. And you could give them a draft, a sample, you know, like what is cost effective and how do you analyze the energy impact?

Because in reviewing these codes of local jurisdictions, they're all over the place.

MS. BROOK: Uh-hum.

MR. HODGSON: I mean they could be from someone's PG&E bill and, you know, they said I did this and it works in two years, and so I would like to make it a standard.

As far as I can see, the Commission would accept that and the Building Standards Commission does the same thing because it's basically a repository for codes, it's not an approval process.

So, I think that would be very helpful to have a common ground so that we actually could understand whether these codes are cost effective or save energy.

On a different issue, Martha, you were talking about rating metrics and this is an issue we brought to the attention of the Energy Efficiency staff for about the last year. And that is, is that the market is driven in production home building by national players.

MS. BROOK: Uh-hum.

MR. HODGSON: And they are using a different scale than what California uses, which is the resident scale.

And it would really be useful, because the market is now rating their product, new homes have ratings on them. And I use that term because that's what they're doing is they're rating them. And in California we're supposed to be using the HERS scale, which no one does.

And so RESNET has a different scale, different algorithms, different math to figure out what the scale -- what the numbers should be and it would really be useful if we could get a conversation between the Energy Commission and the product home builders, who are using the scale, and RESNET, and try to come to some common agreement, which I'm not sure if that's possible.

But the discussion hasn't occurred and we've tried to encourage it for over a year now.

So, if we're going to have rating metrics, and we like market-driven rating metrics, then the market currently is using a scale that California doesn't recognize, or the California Energy Commission doesn't recognize and that's the RESNET scale.

So, if there's anything that we can do, CBIA can

do to help that conversation, we know who the players who are using the scales, we can invite them to a meeting here at the Commission and try to talk about it, but I think when it gets down to the actual math someone's going to need to dissect what the differences are and what it's impacts are for the State of California.

MS. BROOK: Yeah, and it's going to be -- I agree, it's not trivial, it's going to be hard for the Commission to move away from using the same basis that it uses to derive the recommendations for standards updates for the rating method. And RESNET is a much different, like you said, set of algorithms and math to determine that.

And it will be hard for us to see the value in doing that when, basically, we think that we're putting more attention to that, those algorithms, and they're more detailed and they --

MR. HODGSON: Well, I agree, I think the Commission has a better process. I'm not objecting to that at all.

MS. BROOK: Right.

MR. HODGSON: I'm just saying that you're out of -- the market is not responding to that process because we don't use that scale.

MS. BROOK: Right, right.

MR. HODGSON: There are national players --

MS. BROOK: I wonder if there's a way that we could figure out what the crosswalk is between the two, so that --

MR. HODGSON: That's a possibility or maybe you influence RESNET to play by your rules.

MS. BROOK: Yeah, good luck with that, right, I mean --

MR. HODGSON: Well, you have to have a conversation.

MS. BROOK: Yeah, yeah.

MR. HODGSON: And right now we don't have a conversation.

MS. BROOK: Right, right.

MR. HODGSON: And I'm encouraging that conversation to start.

MS. BROOK: Okay. Okay.

MR. HODGSON: And we can bring the players who actually are impacted by the --

MS. BROOK: Right.

MR. HODGSON: -- building scale.

MS. BROOK: Right, yeah.

MR. HODGSON: But the perception right now, we're talking about rating metrics, the residential new

construction market totally ignores the California Energy Commission's rating metrics.

MS. BROOK: Okay. Well, because we haven't ever asked them to do it, right.

MR. HODGSON: Well, theoretically, I think there's a law --

MS. BROOK: We've never asked them to do it. HERS has always been focused on existing buildings to date.

MR. HODGSON: Isn't there a State law that if you do a rating in the State of California, you have to use the California Energy Commission's rating technique, scale? That's my understanding of the law.

MS. BROOK: But what I'm saying is that this is the first time that a whole building -- if we implement a HERS requirement, a rating requirement, it will be the first time that it gets applied to newly constructed buildings.

MR. HODGSON: My understanding is the HERS 2 rating scale that we discussed and adopted three years ago, from a zero to 250 covers new construction.

MS. BROOK: But it was never -- there was never a program in place that implemented it.

MR. HODGSON: Well, I don't think there's a program, but I do think there's a law.

MS. BROOK: Which is why we have to -- we can't do this -- we can't do this design rating without figuring out how to go into that law and make modifications.

MR. HODGSON: And all I'm doing is encouraging that conversation to occur sooner than later.

MS. BROOK: Okay, good.

MR. HODGSON: Because we're trying to rate homes, we're trying to get to zero, what does zero mean, and California's being kind of left out of that conversation.

MS. BROOK: Uh-hum.

MR. GABEL: Mike Gabel, just to address Mike Hodgson's question about locally adopted standards, I agree there's a whole lot of chaos out there and all sorts of calculations turned in on napkins by local governments about cost effectiveness.

Not a lot, but there's some. And I think that Warren Alquist, unfortunately, says what the rules are with respect to the Commission and their approval process. And so unless you change Warren Alquist, you're kind of stuck with the current status quo, in my opinion.

MR. SHIRAKH: Okay. Jon?

MR. MC HUGH: Jon McHugh, McHugh Energy. Going

back to Martha's presentation earlier. A couple of things, I thought I should bring forward. One is that -- my understanding is that Cal Green still doesn't cover, what is it, high rise residential. I can't remember if they cover hotel/motel, but I know at least high rise residential is not covered. And so that would be a significant area to expand the coverage of Cal Green and, of course, the REACH standards, too. So, that's good news.

The next one is the -- you know, prerequisites are essentially a place to go beyond the base standard for things that aren't in the ACM. And so, you know, you've brought up a lot of issues around, you know, supermarket refrigeration, which is not as part of the ACM.

But also another place is essentially lighting that is in unconditioned and outdoor spaces, those are also not in the ACM.

And I'm a member of the ASHRAE Standard 189.1, which is the standard for high performance buildings, and we use a similar kind of format for going beyond the ASHRAE 90.1 nonresidential energy code and for the 189 standard we have higher standards for buildings. And in particular, for outdoor lighting, we have higher requirements, or more stringent requirements, or lower

lighting power allowances for outdoor lighting.

And I've been talking with the CASE author, who did the work on the base standard lighting LPA and he thinks that there's some opportunity, you know, for more stringent LPAs for those REACH standards, and I'd like to make sure that's, you know, thought about.

MS. BROOK: Okay, great, thank you.

MR. MC HUGH: Thank you.

MR. SHIRAKH: Any other questions on the REACH Standards? Mike?

MR. MC GARAGHAN: Mike McGaraghan, Energy Solutions. First, I just wanted to touch on the plug load controls issue and thanks to the Commission for bringing that up today, even though it's still sort of in flux.

But what I'm hearing from the Commission is that you're reluctant to move forward on that type of a measure without data demonstrating how practical or how -- you know, what the savings trends are.

And what I'm hearing from the building industry is that they're very interested but lacking motivation to really push it out there. And I think what they could use and what they're saying that they need is more indication from the Commission that the Commission is moving in that direction towards plug load control

codes. So, it's sort of a chicken or the egg problem.

MS. BROOK: Uh-hum.

MR. MC GARAGHAN: Obviously, there's other opportunities and other methods that we can take to try to get the technology out there, whether voluntary programs, or Energy Star, but to the extent that we can move this forward now and that we don't want to miss an opportunity I just -- I want to keep this discussion going.

And, certainly, I'll follow up with Mike and Bob. Mike mentioned that a couple tract builders are starting to look into plug load controls. I don't know if they've already started installing them or if it's an idea coming down the pipeline but, you know, if we can collect some of that data in the near term, maybe we still have a chance to look at that and see if the savings are there and if they're reliable.

Other options would be to look at things like set-back thermostats and see if we can draw some comparisons to the way residential consumers are responding to that sort of a voluntary savings opportunity in their home, or to compare with nonresidential applications of plug load controls, which are already installed, and make some comparisons there to how well the controls are working and the savings

that are being achieved.

So, I think that's all I wanted to say, just that I'm glad that it's, you know, in the discussion here, and let's try to push it forward.

MS. BROOK: And one thing that -- one thing that we could do, again to try to raise awareness of the technology, is to include it as a compliance option, but significantly de-rate any kind of savings estimates from it. Just so that, again, it gets into our compliance manual, people understand that it's an option that we'll be considering more and more in the future, but currently, you know, maybe it gets a tenth of its expected energy savings or something, I don't know.

We have to be careful because a tenth of plug load could still, you know, trade away some pretty important efficiency features. So, that's -- I agree that we should keep talking about it.

MR. SHIRAKH: Well, even for a degraded compliance option how would you -- where would you start? We don't have any data to show what kind of savings we can expect from this, unless we get something from the builders or --

MS. BROOK: Well, we have non-res that's --

MR. MC GARAGHAN: Yeah, just some of the ideas that I was just mentioning, we could look at non-res

savings and just the Residential CASE report, too, takes an approach to establishing a savings methodology just by outlining applicances.

MR. SHIRAKH: And non-res would be what, like offices? I mean that's so different from residential, where you've got kids, and teenagers and --

MR. MC GARAGHAN: Sure. Sure. So, the approach in the Residential CASE Report outlines -- you know, it looks at all the typical appliances and electronics that are in homes and their rate of distribution in homes, their standby wattage, their off-mode wattage, their duty cycles.

So, you know, it sounds like the HERS Whole House program also has a table of assumptions about appliance frequency and duty cycles that we could compare to.

MS. BROOK: Uh-hum.

MR. MC GARAGHAN: And so that's the way we've built a savings analysis so far and I think we've taken a pretty conservative approach to it. We're not assuming any savings from lights getting left on all night or electric heaters that are on all night, all the savings that we've shown are here and there, a watt or two, or three watts from electronics, mostly, that are left on, you know, either in standby or off.

And that analysis came up with savings numbers that showed that the controls would be cost effective using REACH TDV so, you know, that's the approach we've taken so far and we can compare other numbers and other vehicles to --

MS. BROOK: Okay.

MR. SHIRAKH: Thank you, Mike.

Any other questions?

MR. FRANCISCO: I'm Jim Francisco with Sierra Consulting, and we've spoke before on condition attic spaces and such. All I want to do is deliver a letter from a developer, he wanted to get information in front of you with facts on unconditioned -- or on conditioned attics and closed attics.

MS. BROOK: Great.

MR. FRANCISCO: I've delivered it.

MS. BROOK: Thank you.

MR. SHIRAKH: It's been delivered, thank you.

Any other questions, comments? I guess folks online can't comment.

Sorry about this. Please, if you have comments, e-mail me. My e-mail address is on the slide, and we'll try to respond to your comments via e-mail.

Apologize. When WebEx works it's great, when it doesn't it's horrible.

So, if there's no more questions or comments we're going to -- I guess there was an agreement to basically wrap this up before lunch.

So, Jon McHugh is going to talk about conditioned ducts and conditioned space. And you can either take my spot or sit over there.

MR. MC HUGH: Good afternoon, this is Jon McHugh and I'm here on behalf of the California Statewide Codes and Standards Program, and talking about a prescriptive proposal for ducts and conditioned spaces.

And this builds on a number of activities done in a number of different areas. One is back in 2000 was a PIER research program on looking at bringing ducts in conditioned spaces. And the reason for this is -- you know, should be kind of readily apparent.

You know, we've spent over the last 20 years increasing levels of effort of trying to address the inherent problem of essentially having 50 degree air in the hottest portion of the house.

So, you've got a duct full of 50 to 55 degree air, it's separated from 140 degree air in the attic by, you know, R-6, R-8 duct insulation and, at the same time, has issues associated with leakage.

And so a number of different groups have looked at bringing ducts into conditioned spaces, whether it's

for Energy Star, or the various Beyond Code programs, the efforts toward zero net energy buildings.

You know what, this seems to be a fairly common measure across all of those various activities where we're not trying to sort of trim around the edges but actually do something substantial in terms of how conditioned air is brought into a space.

And so this picture here shows a variety of different ways of bringing ducts into conditioned spaces. The conventional one, on the upper left, is the conventional method of just having the ducts in the hot space, but we can also create chases in the space and bring the -- or in the building and bring the ducts below the insulation level, or we can make cathedral ceilings, increasing the volume of the space.

The other nice aspect to that is now our thermal boundary, our vapor boundary and our pressure boundary are all in the same location.

Or we can use a scissor truss, which is essentially like an attic, has all the same features in terms of it being ventilated, et cetera, except it's got a different shape, and so we can hide the ducts, essentially, in the conditioned space.

And, you know, in contrast to where we're going right now, where I mean insulting the roof duct has a

substantial impact on the energy consumption of buildings. You know, in general you're taking something where the ducts, instead of being in 140-degree space, in Sacramento summer it's now going to be essentially around that ambient air temperature, around 110 degrees. But we've still got 55-degree ducts in 110-degree space.

And, you know, if you think in terms of resource efficiency, we're essentially taking two layers of insulation to do what we really should be doing with one layer of insulation. So, you know, this is actually quite similar to a measure that I brought to the Commission staff back in 2005, around insulating drop ceilings where we have -- we have a layer of insulation and then we have air that's essentially bypassing the insulation.

Well, we're purposely bypassing the insulation. But, of course, this insulation on the roof deck has a lot of impact, it is knocking down the temperature and is addressing the issue of absorbed solar radiation on the roof.

So, you know, moving forward looking at, you know, there's a variety of different methods that we can use. We can essentially make a little sort of mini-attic where we have a vented cathedral ceiling. We have a ventilated space that's acting similar to the

ventilated space in the attic and we've just shrunk that down and now we've moved all the ducts and all the conditioned space right underneath the roof.

There's also thoughts about using unvented cathedral ceilings, where we use air impermeable insulation. Basically, use foam, fill up that cavity. The same kind of idea, we -- there's a -- again, we have the benefit of the air barrier, the thermal barrier and the moisture barrier all in the same location, keeping the ducts in the relatively cool, unconditioned -- or conditioned space.

And now we've got that R value of, you know, R-38 or R-30 between the outdoors and the cold air in our air conditioning ducts.

So, this is the sort of scissor truss, and this is one way of doing this. So, you have a truss, you -- and it just has a different shape to it. It has insulation just like a ceiling, or just like an attic, so it's keeping the -- it's still got a ventilated attic, just like a standard attic, it just has a different shape to the floor of the attic.

And then it allows you to put ducts inside the conditioned space and yet still have the standard look of a, you know, flat ceilings that people are used to.

Some people may choose to have the different

shape but if, you know, just to keep it similar to what people are used to, you can just tie the ducts with some drywall.

And the costs are actually not -- are not very substantial. You know, I guess I rate -- at this point I should make note that much of this work was done by John Arentz, of Architectural Energy Corp, and he's under contract to the CASE team.

And in talking with the truss manufacturers he found that, you know, the cost is around 18 cents a square foot for the modified truss. And then that -- that the cost for the prototype that we've been using for, you know, evaluating the efficiency standards, we've been using this 2,700 square foot prototype house. For that, the truss cost is $260 and then there's additional drywall and taping so that we're maintaining this pressure boundary, and it's fireproof and airtight.

And overall there's slightly more additional insulation cost because now we actually have more surface area.

So, this has a fairly small incremental cost of $160.

And then depending on how you install the insulation, you might need some netting that would add some additional cost. In addition, there's some costs

that when we looked at the benefit cost of this particular measure we said, well, let's -- we have some additional savings, but we'll just consider them gravy, essentially.

And one is that you can save -- you know, for these prototypes save around $200 plus for duct insulation using the values that were used for the package A development.

There's -- as we'll see, there's HVAC downsizing opportunities somewhere between, you know, a fraction of a ton and all the way up to a ton in some of the climate zones.

Depending on who you talk with, this could actually simplify envelope sealing especially if you're using a cathedral ceiling. All this costing has been done for the scissor truss just because it is so comparable to the base case or typical construction practices so that in terms of folks saying, you know, we're not used to building buildings in this different way, you know, we looked at one of the actually more costly, but more comparable methods of building houses.

And this is probably a little bit small to read but, you know, so we estimated somewhere around $1,400 and this comes in line with the builders' estimates in the peer study. And the documentation is here and

we'll, of course, post it on the website, or ask the CEC to post that.

In addition, ConSol has done some work on this very subject and in there they describe a -- in one of their articles about bringing ducts into conditioned spaces, the added cost for a production builder was only $500 to bring ducts inside a conditioned space. This is a slightly different situation where they're putting ducts in the floor truss and building a sealed and insulated mechanical room.

And this is noted here, this is Ryan Kerr's paper, back in 2008, in home energy.

So, we made use of the new simulation model and these comparisons are relative to the 2008 standards. We had a -- and I'll show a table in just a second which has sort of, you know, all the details.

But, you know, present value to energy cost savings between 60 and almost $4 per square foot, which is similar to, you know, Bruce's findings, described earlier, somewhere between 9 and 15 percent of the overall energy consumption of the regulated energy components.

And I looked at the -- I compared this to the package A, I decomposed the package A measures and this had between two to five times more energy savings than

placing R-13 underneath the roof deck. So, you know, slightly more cost, but substantially more energy savings.

When I looked at this, you know we had a benefit cost ratio. There was only one climate zone where the benefit cost was less than one. And, you know, most of the climate zones the benefit cost ratio was over two and as high as six in climate zone, I believe that was 15.

Now, this is, you know, using current costs. My expectation is that the market is very good at, you know, squeezing out costs. But nonetheless this was cost effective in all zones, except climate zone 5. And there's potentially some, I believe, synergies with the envelope sealing requirements, especially related to the requirements for compliance that Bruce has described earlier.

Reduced material expenditure and also I think prepares the market -- if, indeed, what we're trying to do is prepare the market for zero net energy buildings, it's my expectation that we won't see buildings with ducts in unconditioned spaces in the future.

If you look at what people have been doing for the zero net energy building pilot projects, in general they're not putting ducts in those conditioned spaces.

You know, some people say, well, you know, there might not be any ducts at all in the future in spaces.

But if we believe that our concerns about indoor air quality is going to require mechanical ventilation, especially in the very hot and very cold climate zones, we're likely going to need to temper the air and that implies that, you know, air systems might be around for a while outside of the mild climate zones.

So, here's some of the numbers and, of course, there's too much details there to really go through. But the main thing is, I would say is, you know, if you assume a total cost, you know, described here of around $1,700 per a 2,700 square foot house, this is a two-story house, and I believe it was around 1,500 square feet of roof area, the benefit cost ratio is -- like I said is between essentially just below one in climate zone 5 to, basically, 6 in climate zone 15.

Again, additional sort of gravy that I mentioned earlier, this describes the reduction in tonnage using the equipment sizing roles that are in the standards and using the assumption of $300 per ton per equipment.

So, you know, there are some feasibility issues, I'm sure some folks will be talking about this later on about, you know, this is a new way of designing buildings. You know, but to some extent, you know,

cathedral ceilings have been around for decades. But in terms of a broad implementation that's only two and a half years out, in terms of putting heating in conditioned space, you know, we have a limited subsection of appliances that you can put in the -- you know, you need to either seal the combustion furnace, a heat pump, or a hot water coil and the air handler. You know, those are different implementations of different types of keeping the combustion out of the conditioned space.

And so there is an issue in terms of preemption in that the minimally compliant furnace is typically, you know, an atmosphere -- you know, it's an atmosphere type furnace.

And so the other, you know, sort of preemption compatible method is to use the sealed mechanical room, as described in the ConSol article.

And we would need some code clarifications on what is the latest thinking on what is allowable for cathedral ceilings. You know, there's different philosophies about it. I would think that vented it is compatible with all the codes, but I would imagine that some folks might push for unvented cathedral ceilings, with potential energy and cost savings.

So, as a proposal, what I'm suggesting here is

that we actually make that bold step towards zero net energy buildings and look at something that actually is fairly simple and relatively constant across climate zones, because this method is actually cost effective across a broad range of climates.

So, looking at basically ducts inside a conditioned space whether -- you know, however you wanted to implement that.

The envelopes tested and sealed to three air changes at 50 Pascals. This is in keeping with the Federal minimum residential efficiency standard against which California is going to be compared against over the next couple of years.

And in terms of when you talk with folks who actually do envelope sealing, they say that three percent -- or that three air changes is something that they regularly accomplish or exceed.

Also, and I'll talk about this in the other presentation, about the package A, R-21. 24 inch on center walls are cost effective or sort of within the margin of error of cost effectiveness. You know, I think the life cycle, you know, had a negative -- either there was two climate zones where the life cycle cost was -- or life cycle cost savings was negative $50. So, you know, in terms of consistency and ease of

enforcement having a, you know, single standard for wall construction and U-factor seems to make a lot of sense.

I think, you know, there's been a great job done on the glazing description and I think that's fairly straight forward.

And then, of course, we're kind of stuck with the federal minimum efficiencies but, in turn, there could be credit for folks actually taking actually simpler and, potentially, less costly methods where they're using sealed combustion or other methods like combined water and space heating, et cetera.

So, I believe that is my presentation.

MR. SHIRAKH: Thank you, Jon. Any questions or comments on Jon's presentation?

The question is was the presentation --

MR. MC HUGH: Oh, was this posted? Oh, okay. So, no, I will send the revised version, yeah.

MR. SHIRAKH: So --

MR. MC HUGH: Actually, Mike, do you have any comments about what you've seen in terms of ducts in unconditioned spaces in -- see any buildings in your program?

MR. KEESEE: Well, we have limited experience with it. We're going through an exercise with the builder right now, that ConSol's familiar with, that we

can't publicly disclose. It's not easy given current construction practices. However, Habitat for Humanity here, locally, has got one. It's got the scissors approach. I think they're going to have some issues with getting insulation in those trusses, but they're doing it.

And that's the challenge I give to my production friends is that if Habitat can do it, maybe others can.

So, but it's absolutely essentially if you're going to get to zero energy, no ifs, ands or buts about it.

So, that's the way it's going to be. Maybe there's a whole way of looking at HVAC that we've never thought of, which is get away from air and go to water-based systems. I would love to try and do that on the radiant cooling side, I just haven't been able to put that together, yet.

MR. SHIRAKH: Thank you, Mike. Any other questions or comments on duct in conditioned space?

Mike, you're cool with this proposal?

Okay, I guess there's no online. And, again, I apologize, send your e-mails to me and we'll try to respond.

MR. MC HUGH: So, I've got another--

MS. BROOK: We wanted to open it up for general

comments, now, on any topic before we close.

MR. SHIRAKH: Wait, he has another presentation.

MS. BROOK: Okay, so this is -- I thought we agreed that you were going to present whatever you're going to present next as part of our general comments because we didn't have an agenda item for you, which is fine.

MR. MC HUGH: Is it okay if I present --

MS. BROOK: Yeah.

MR. SHIRAKH: Okay, Jon's got another presentation on the packages, so go ahead, Jon.

MR. MC HUGH: Thanks. So, this is a some thoughts about another path for selecting measures for package A.

And you guys can correct me if I've got this wrong, my understanding of the process was that you looked at, you know, a variety of cost-effective measures but then at the end of the day there was essentially a cap placed on just how much pain the building industry could accept, you know, what is the first cost.

And I thought -- what I thought what I heard underlying that was a concern about affordability of new construction.

And our understanding of affordability is maybe

a little bit more nuance than just the issue of what is the first cost. And this kind of takes this approach that, you know, if the sum of the mortgage costs and energy costs is less expensive with higher levels of efficiency is that building that costs less on a monthly basis, is that indeed less cost effective, even though it's first cost was higher?

And should we be looking at other metrics? You know, because first off there's this cost effectiveness metric and, clearly, we're not going all the way to the bleeding edge in terms of cost effectiveness and there's sort of this idea to kind of step back a little bit.

And the question is, well, how far do you go? We can say what is the minimum threshold for saying something's cost effective, but is there any sort of maximum that, no, we're not going to do more than something this particular code cycle and -- and go ahead, Pat.

MR. SAXTON: Yeah, so, Jon, I think you're substituted cost effective for affordability here from time to time.

MR. MC HUGH: Okay, thanks. So, the issue is, is there another way of looking at this, you know, the issues of cost effectiveness and affordability to try to come up with another metric that may help guide what we

should be looking at?

And, you know, as mentioned here, the -- you know, if we look at our hottest climates, because those buildings use so much energy and they have such high energy costs, it's not surprising that to get to comparable percentages of savings that you might be spending more to, you know, save quite a bit of life cycle cost.

So, you know, there are a variety of different packages that were initially run, and this is at the other meeting where we described sort of the maximum efficiency package, one that looked at minimum life cycle cost as you looked at all the measures combined.

And then sort of a package three which looked at some political feasibility issues, and then looked at a cap, you know, placed on first cost.

And so I took a look at this same data and looked at one measure at a time which, you know, to some it's like -- I looked at all the measures at that maximum efficiency level and then varied one measure at a time and this would give me a conservative estimate of the value, of the savings, so it was actually making them less efficient from that maximum efficiency level. One at a time and then leaving all the other measures at their highest efficiency.

And then what I did was I looked at this and identified which ones had a benefit cost ratio over one when you looked at them individually, not as a -- you know, not sharing savings across measures and looked at that over the period of analysis that's required for residential measures, which is the 30 years, and kept track of these various parameters.

So, the other way to look at this analysis is to do a cash flow analysis and using the customer's viewpoint, and taking our nominal three percent or, I'm sorry, our real three percent discount rate and decomposing that into a nominal five percent interest rate and a nominal energy escalation rate of two percent, kind of work your way back to that three percent real discount rate.

So, I looked at the same 30-year period of analysis that you look at for a typical residential mortgage, looked at a ten percent down payment, again fairly typical of mortgages or at least maybe prior to a year ago.

And also then -- also evaluated these various cash flow metrics. So, how much am I spending each month? Is my savings from my -- from these various energy features, are they saving me more money than the incremental cost of the mortgage payment that I have for

those features?

And then, also, how long does it take to actually pay back my down payment for those features.

And then, if I essentially borrowed money for my down payment how long would it take to pay back from the savings associated with my utility bills and the difference between my utility bills and my mortgage payments to maybe pay off this additional loan for my down payment?

So, I looked at all three of those metrics and then I looked at various measures. And so this was one of the measures which was evaluated, which was wall insulation of a particular climate zone and it had a BC ratio of 1.6.

You know, so I had an incremental cost of $400, ten percent down payment was $45, and then that resulted in an annual loan payment of $36. And, also, on the first year I'm saving $37.

Now, if you look over at the utility savings, this utility savings escalates two percent per year, but my payment, just like a regular mortgage, is fixed. So, I have my $45 up front that I paid for the ten percent of the measure and then -- and then over -- you know, and then each year I'm paying my $26 mortgage payment for the -- for the additional cost of the measure.

And by the first year my net cost that I'm paying is -- I've had this first cost, but by the first year I'm saving money on my combined utility bill and my mortgage payment, so I'm positive in terms of my cash flow on an annual basis.

And then by the fourth year I've essentially paid off my down payment, whether you look at it in terms of a -- in terms of nominal dollars, or even if I borrowed money I would have paid off that loan for that down payment within four years.

So, what this shows is that this looks fairly attractive for the consumer in terms of affordability for measures that have this BC ratio of greater than 1.6.

Now, here's one where this is a measure that's kind of marginal, it has a BC ratio of 1.08, so it's just barely squeaking by in terms of its cost effectiveness. And there the -- it takes four years before I even see a nominal positive cash flow on an annual basis and it takes, you know, 16 years before I see I've paid off that down payment. And if I borrowed money for that down payment, it would have taken me 21 years before I saw a discounted positive cash flow, cumulative cash flow.

So, when you do that you realize that all of

these things are essentially -- all of the other variables are essentially fixed except the benefit cost ratio. And from that what you can do is then parametrically vary the benefit cost ratio and then you can start seeing, you know, what happens in terms of -- you know, if I have a benefit cost ratio of 1.1, it takes a long time until I head up the years to positive cash flow.

Whereas, you know, once I'm at essentially, you know, 1.3 I've got a positive cash flow in the first year and, you know, if I use a BC ratio of 1.5 you can see that I end up paying off my down payment within six years total.

So, with that in mind then you start you say, okay, let's pick a metric. You know, whatever you feel is the appropriate metric in terms of identifying what is the appropriate time line to pay back my down payment and then take a look at the results.

And so that's exactly what I've done. The shaded areas identify what's the cost of -- you know, kind of Warren Alquist cost effective in terms of BC ratio greater than one.

But let's say, you know, for instance if you used a BC ratio of 1.5 or 1.3 you'd start saying, okay, in climate zones 11 and 13 I really should be moving to

R-8 duct insulation, if I'm looking at duct insulation.

By the way, what I'm doing is I'm comparing the staff-recommended proposal to the maximum savings package. And then in cases where the space -- the cells are shaded it indicates, hey, I could actually go to a more stringent requirement and be cost effective for each of these measures.

And then even amongst those shaded ones I could then choose, also, I look at the far right column and I can choose my benefit cost ratio and say if I use a benefit cost ratio as a criteria potentially I can actually bring other -- you know, trim this down a little bit more.

So, for instance, in climate zone 9 I might say, well, you know, this is a benefit cost ratio of 1.05, it's kind of squeaking by. And if I us some criterion like, for instance, 1.3, I'd say, well, in this case the climate zone 9 I wouldn't increase -- or decrease the infiltration rate.

But for climate zone 10, and 11, and 12, and 13, et cetera, I could increase the stringency of the standard, still provide, you know, whatever I've decided as the appropriate metric of affordability and then that actually helps provide a kind of a systematic way for evaluating these measures.

A similar kind of thing for QII, you know, certain climate zones it makes sense to -- especially the hot climate zones.

You look at roof deck insulation, what this indicates is that higher R values could be used for roof deck insulation than what's in the proposal.

You know, including some, like if you look at climate zone 9 and 10, BC ratio of 20, that's -- you know, that's paying back in that first year, you know, not -- you know, everything is getting paid back very fast in that kind of situation.

And then if you look at wall -- this is wall insulation and there's a bunch of things where it says divide by zero. Now, this is the fairly small changes of, you know, saying, well, we're going to use the 24 inch on centers as the basis, so there's essentially no cost. And, in fact, some people could argue that there's actually a reduced cost in using the larger on-center spacing.

But it also indicates that, you know, some of the areas where we've kind of -- we've stuck to four-inch studs and R-15 walls, you can look at, for instance, climate zones essentially 2 through 5, you know, these are all BC ratios over one and a half. Again, relatively fast payback.

So, it gives you a fairly consistent method to look at these various -- a systematic way of evaluating the measures.

And so I'm coming down to the conclusions which is that first cost is not a good measure of affordability. We have some other ways of evaluating affordability, like looking at cash flow. And recommend that we at least look at a minimum, you know, criteria of one year to positive annual cash flow.

And as an example, a BC ratio of greater than 1.3 gives you that one year annual positive cash flow. It shows the eight year payback of the down payment and then, you know, 22 years of further savings for the homeowner.

And if you did that, then you would -- potentially, you know, what I've -- you know, if I just consistently applied that rule, then you could increase the stringency as described in those bullets.

And now this is -- and that this is extremely conservative. You know, the definition of cost effective is, you know, taken in its entirety.

So, ideally, you would actually look at your packages, use the BC ratio metric. You know, I've done it just on individual measures.

But, you know, ideally, you would take your

packages and say here are these packages and they're hitting a particular BC ratio.

And then this just shows if you use BC ratios greater than one, so this is the sort of the Warren Alquist BC ratios.

But, you know, if you use 1.3 what you can see is a benefit cost ratio of 1.3, it really doesn't change the outcome that much. There's a bunch of energy that's still left on the table that is cost effective and also provides an appropriate cash flow for the consumer.

So, thank you.

MR. SHIRAKH: Thank you, Jon. Any comments on Jon's presentation on cost effectiveness methodology?

Pardon me? John?

MR. ARENTZ: John Arentz, ADC. Yeah, just one comment, Jon, thanks for this analysis, it's a different way of looking at it.

But, you know, one thing also to consider when we're looking at the integrated analysis is that the benefit cost ratio is just one metric.

You know, when we look at doing interactive effects and loading order another way is to take the measure that has the most energy savings first, so make sure we capture that so that we don't lose that in the end game. But thank you.

MR. SHIRAKH: Mike?

MR. HODGSON: Yeah, a quick comment. Mike Hodgson, ConSol, representing CBIA.

You know, I think it's a good analysis and it's an interesting analysis, but one of the issues that comes up besides energy is on air infiltration. We have an issue about indoor air quality. You know, we've made a fairly large case as we're very concerned about reducing air infiltration rate. It may be a great energy idea but there's other interactions in here.

So, I mean this is, I think, a pretty straight forward way of looking at it, which I think is useful. But I think when you start picking packages you've got to -- like a previous speaker said, you've got to start looking at other issues, also, in addition to that.

MR. MC HUGH: And I'd just like to point out that, you know, when we do the case studies and, of course, all these evaluations, that cost effectiveness in addition to feasibility. And so you're absolutely right in terms of air quality, that's an issue.

But, you know, presumably that's why we have mechanical ventilation in these spaces.

MR. HODGSON: Presumably, you're correct.

MR. MC HUGH: Yeah.

MR. HODGSON: Yeah.

MR. SHIRAKH: So, again, I would just add to what Mike said. I mean there's cost effectiveness is the first criteria, then there's nothing in the Warren Alquist Act that says that if it's cost effective it shall be adopted. I mean that's just the first.

On the question of, you know, we had, actually, in our package the recommendation for ACH-50, but we actually got comments from our sister agency, Air Resources Board, who were adamantly opposed to that.

So, other things come into play rather than just BC ratio and, you know, we're obligated to consider all comments, not just cost effectiveness.

Pat?

MR. SAXTON: So, I guess one of the questions is, you know, where do we go from here because the whole point of this was just to take a poke at this issue of what we call affordability, there's more than one way to look at this.

So, questions of the staff that, you know, does it make sense to sort of take a look at alternatives to the staff proposal for package A at this point?

MS. BROOK: Yeah, I guess what we could do is look at Jon's presentation and see if we missed anything, if there's something that's blatantly affordable, and it's cost effective, and it doesn't have

any of the other issues that Mazi was alluding to, then we can certainly do that. But I don't think --

MR. SHIRAKH: I mean, we must --

MS. BROOK: -- any of the issues that we were grappling with, that got us to arrive at package A-3 have changed and we still have all those issues. So, I don't know, maybe it would help if we summarized those so you would understand where we're -- if we're not being as aggressive as you think we ought to be, you understand why we're not. I don't know, we can certainly do that if you think it would be helpful.

MR. EILERT: Well, I don't think we've really addressed the issues sufficiently. I mean when we're looking at sorts of measures for which -- for which in the first year, you know -- you know, the energy savings exceeds the cost of the mortgage, for example.

Now, we ought to have a really good reason not to include that in the standards and so far I haven't heard them on some of these measures.

MS. BROOK: Okay.

MR. EILERT: One of the issues that's been brought up by industry is the need for education and training and, at a minimum I think it -- you know, we've started a conversation statewide about how we can sort of take a look at some of these big changes and develop

an educational program around that.

You know, I've spoken to the manager of our energy centers and so we will develop a plan over the next few months to do that, so there will be support in that area going forward.

MS. BROOK: Okay.

MR. EILERT: But again, I just don't feel -- I just feel like we're leaving a lot on the table and I just haven't heard, you know, very good reasons for not doing some of these things and maybe it is clarification in part. Thanks.

MR. SHIRAKH: One of the things I need to mention is that the package A-3 has not -- given that we can't actually adopt everything that's in it, there's still a lot of comments related to the specific measures that's in A-3 that we need to -- I mean, it's not like that A-3 is the baseline and it's given, we can move forward from there, you know. We still have to do a lot of work to -- for instance, the roof deck insulation has a -- you know, this is something that I've been advocating myself all along. It still has a whole host of issues related to it, to moisture, to fire, to building practice and, you know, which education would probably address some of that.

So, you know, we're not even sure that we're

going to have A-3 as a slam dunk at this point.

MR. EILERT: So, you know, we don't want to ignore these issues, but where those issues don't occur, you know, we think there's this -- this is another good way to look at affordability and I'll just leave it at that.

MR. SHIRAKH: Thank you, Pat.

Mike?

MR. GABEL: A quick procedural question. So, in October, from the original schedule, that you're going to have sort of a preliminary draft express terms summary of the standards.

MS. BROOK: Uh-hum, uh-hum.

MR. GABEL: Are you going to have kind of a summary of the staff's final determination on the package A measures before then or is it -- are we going to kind of wait until then to see where the staff comes out on some of those?

MS. BROOK: Yeah, I mean I think our -- our idea is to keep you informed all the way along.

MR. GABEL: Okay.

MS. BROOK: So, maybe we could talk about how to do that. I mean, I -- I mean we don't want to have any more workshops because we have to start writing code language.

MR. GABEL: Yes.

MS. BROOK: So, I don't know, what do you think, Mazi, is there a way that we can say before the end of September what we are going forward with, with the package?

MR. SHIRAKH: We can post it on the website.

MS. BROOK: Okay, so I guess as soon as we think that we've resolved all the issues and we're firm on going forward, we could -- we can post a summary of the residential package.

MR. SHIRAKH: For the 2008 standards we actually had a one-day workshop where we presented actual code language. It is still, you know --

MS. BROOK: Well, actually, it might be more than one day, but that's what was intended by the schedule that says -- it was like in light blue, and it said something in the first week of October. The idea is that we would present all the code language changes in one or two workshops, with our Efficiency Committee attending, so they can hear any remaining issues that all parties have on what staff's proposing.

So, that's what that first October 7th -- it's not that date, but we're targeting that week.

MR. SHIRAKH: So, that's definitely something we can do, which is sort of analogous to what we did in

2008. You know, I don't know if you remember Art and Jackie were here.

So, yeah, we can do that. And, hopefully, we can post it within a day before the workshop so you guys will have a chance to actually review.

Any other comments related to Jon's presentations? Any comments related to anything we discussed today at all? This is the public comment period.

If not, I think the meeting is adjourned. And, again, we will be in touch with most of you through our stakeholder meeting process and there's still issues to be resolved.

Thank you so much.

(Thereupon, the Workshop was adjourned at 12:35 p.m.)

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REPORTER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF,

I have hereunto set my hand this 7th day of September, 2011.

Kent Odell

Kent Odell
CER**00548