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Case: Commercial AC/Furnace Working Group ASRAC Commercial Package Air Conditioners and Heat Pumps and Commercial Warm Air

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U.S. DEPARTMENT OF ENERGY PUBLIC MEETING

COMMERCIAL AC/FURNACE WORKING GROUP

ASRAC COMMERCIAL PACKAGE AIR CONDITIONERS AND HEAT PUMPS AND COMMERCIAL WARM AIR

U.S. Department of Energy

Forrestal Building, Room 8E-089

1000 Independence Avenue, SW

Washington, DC 20585

9:03 a.m.

April 28, 2015

Appearances for Department of Energy Meeting

John Cymbalsky, DOE
Eileen Barkas Hoffman, Facilitator
Ted Bantle, Facilitator
Mary Anderson, Pacific Gas and Electric Company
James Battaglia, Navigant
Detlef Westphalen, Navigant
Andrew deLaski, Appliance Standards Awareness Project
Joanna Mauer, Appliance Standards Awareness Project
Paul L. Doppel, Mitsubishi Electric US, Inc.
Chandra Gollapudi, Emerson Climate Technologies, Inc.
Jill C. Hootman, Trane
John J. Hurst, Lennox International
Diane M. Jakobs, Rheem Manufacturing Company
Nicholas Misiak, Air-Conditioning, Heating, & Refrigeration Institute
Karim Amrane, Air-Conditioning, Heating, & Refrigeration Institute
Steven J. Rosenstock, Edison Electric Institute
Harvey Sachs, American Council for an Energy-Efficient Economy

Rusty Tharp, Goodman Manufacturing

Meg Waltner, Natural Resources Defense Council

Robert J. Whitwell, United Technologies

Alison Williams, Lawrence Berkeley National Laboratory

Dave Winningham, Allied Air Enterprises

Katie Coughlin, LBNL

Greg Rosenquist, LBNL

Gary Fernstrom, CA IOU's

Travis F. Hardin, UL, LLC

Charlie McCrudden, ACCA

P R O C E E D I N G S

MR. CYMBALSKY: So, this is John Cymbalsky from DOE. Welcome everyone to the first meeting of the CUACCWAF working group, so CUACCWAF we'll call it.

So, this working group was chartered back in March. We have a very aggressive schedule to finish our work in mid-June. So, today we're going to go over -- in the morning we're going to over -- after introductions, we're going to go over some process stuff.

I'm going to turn it over to our facilitators, who are going to briefly introduce themselves and what they do, and then we'll go around the table for introductions. We have our ethics representatives from General Counsel coming right at 9:30, so we'll need to do that right away and then we'll get into the content of the working group after that.

MS. HOFFMAN: Okay. Thank you. Hi, I'm Eileen Barkas Hoffman, one of your facilitators. And my colleague, Ted Bantle, will say a few words too, quickly, but we're from the Federal Mediation and Conciliation Service, the independent federal agency that does this, which is kind of fun. We get paid to do this. And we also settle labor disputes if you're a soccer or a baseball fan, thanks us or not, whatever. But we basically deal with these kinds of meetings and look forward to working with you on this important rule.

Also, we had the experience of working with John and Joe Hagerman for manufacturing housing successfully resolved last year. So, we look forward to it.

MR. BANTLE: Good morning everyone. As Eileen said, my name is Ted Bantle. I'm a mediator with FMCS as well. Happy to be here. As Eileen mentioned, we did have some experience last year during the manufactured housing rulemaking. So, we're really here to lead the process. You are all the process experts. We'll stay out of your way on the details, but if you do have questions at any time about the facilitation process, about our role, let us know.

And you probably will at some point see one of our colleagues, Javier Ramirez here as well. So, I'll kind of pseudo introduce him at the moment as well. So, thank you.

MS. HOFFMAN: John, do you want to go around the room now?

MR. CYMBALSKY: Right. So, we'll go around the room. I'll start. So, I'm John Cymbalsky. I'm the program manager for Appliance and Equipment Standards at DOE, and you're all lucky to have me as the federal representative of this. You don't always have to be the smartest guy in the room to get the job done, but in my mind, though, we're going to stick with that.

MR. STAS: Eric Stas with General Counsel's Office.

MR. COCHRAN: Pete Cochran, also with DOE General Counsel.

MR. GOLLAPUDI: I'm Chandra Gollapudi. I'm with Emerson Climate Technologies and Air Conditioning. I'm filling in for Sammy. He's in Marketing. I'm in Marketing as well.

MR. THARP: Rusty Tharp with Goodwin Manufacturing.

MS. WALTNER: Meg Waltner with Natural Resources Defense Council.

MR. STARR: Louis Starr with Northwest Energy Efficiency Alliance.

MR. SHOWS: Mike Shows with UL.

MR. SACHS: Harvey Sachs, American Council for an Energy Efficient Economy.

MR. MILSLAK: Nick Milslak, Air Conditioning, Heating, and Refrigeration Institute.

MS. JAKOBS: Dianne Jakobs, Rheem Manufacturing. I'm here for Karen Meyers.

MR. MCCRUDDEN: Charlie McCrudden, Air Conditioning Contractors of America.

MR. HURST: John Hurst of Lennox.

MR. FERNSTROM: Gary Fernstrom representing the California Investor Owned Utilities, which are PG&E Southern California Edison, San Diego Gas & Electric, and the Southern California Gas Company. And I'm filling in today for Marshall Hunt, who is having a wonderful time vacationing in Italy.

And I'd like to introduce my co-worker, Mary Anderson, who is in the audience representing PG&E.

MS. HOOTMAN: Jill Hootman, Trane.

MR. WHITWELL: Bob Whitwell, United Technologies, Carrier.

MR. DOPPEL: Paul Doppel, Mitsubishi Electric.

MR. CYMBALSKY: Thank you.

MR. ROSENQUIST: Lawrence Berkeley National Laboratory.

MS. WILLIAMS: Alison Williams, Lawrence Berkeley National Laboratory.

MR. BATTAGLIA: James Battaglia, Navigant Consulting.

MR. WESTPHALEN: Detlef Westphalen, Navigant Consulting.

MR. CYMBALSKY: If you could all just stand up in the back in the gallery and please state your name and affiliation.

MR. WINNINGHAM: Dave Winningham with Allied Air.

MR. HARDIN: I'm Travis Hardin with UL.

MS. MONTELLO: I'm Pam Montello, and I'm with the Office of Conflict Prevention and Resolution with the Department of Energy.

MR. GORDON: Wade Gordon, DOE's Office of Hearings and Appeals.

MR. FEIN: Steve Fein. I'm also with the Office of Hearings and Appeals.

MR. ROSENSTOCK: Steve Rosenstock, Edison Electric Institute and member of ASRAC 90.1.

MS. COUGHLIN: Katie Coughlin, Lawrence Berkeley National Lab.

MS. ANDERSON: Mary Anderson, PG&E.

MR. CYMBALSKY: Okay. Great. I know we also have some people on the webinar. How many we got today, Emily?

EMILY: We have 18.

MR. CYMBALSKY: So, I'm trying to get all our members here. So, I know Andrew hasn't arrived yet, Andrew deLaski. Is Mark Terzignini on the webinar?

EMILY: No.

MR. CYMBALSKY: Okay. All right. We have

a few MIAs, but the show must go on. Okay.

I'm going to say a few words about the introduction and what the role of the group is and a few process issues.

So, most of you are familiar with the building, but for those of you who are not, we're in a big square right here in this building. At each corner of the square, you'll find restrooms for your convenience. In case there is an emergency, we're going to go out the room, make a left, and then we're going to go down the stairs and we're going to get eight floors of exercise to evacuate.

Also, on the ground floor you probably know there's a coffee shop and a Subway, and there's also access to the DOE cafeteria when the time comes for lunch.

And so, Andrew, if you want, just introduce yourself for the record.

MR. DELASKI: Andrew DeLaski, Appliance Standards Awareness Project.

MR. CYMBALSKY: Okay. Thank you.

Okay, so the purpose of today's meeting

we're going to go over a brief overview of what ASRAC is. We're going to do a brief discussion on the background of the rule. Our mediators will give us an overview of the negotiation process. We're going to go through the ground rules and establish what the ground rules are.

We're going to also go through and schedule the rest of our meetings through June, and at the same time we hope to identify what the key issues are in the working group so that we can best schedule these meetings because if we know there's 10 issues instead of 5 issues I think we're going to have to be a little more diligent on our scheduling.

And then if time permits, and I hope it does, you'll see some very detailed slides about our analysis that was part of the NOPR. We understand there's been some meetings amongst industry and the environmental stakeholders on key issues that they found in the NOPR. So, it is DOE's hope that a lot of these may have been worked out a head of time so that we can hit the ground running, so to speak, but I know there's also a few members who weren't a part of those negotiations. So, we'll have to discuss those as we go through.

Okay, so as I said in my opening remarks, this working group was chartered by ASRAC in March. DOE formed the ASRAC back in 2012 to further improve the process in establishing standards. We've been pretty successful to date. We've had I think about four or so rulemakings that have gone through the process. All, in my opinion, have been very successful. I think that you'll find, as we go through this, that this process lends itself to more real time back and forth between DOE and the stakeholders, which is something people have expressed to me that is very important to them. So, I hope we do get that back and forth. We do get a lot of data sharing from everyone in the room. It's very important for the rulemaking.

Just to point out that ASRAC is solely advisory in nature, so whatever this working group decides will be floated up to ASRAC, the parent committee. And Andrew deLaski is the ASRAC member on this working group, so he'll be -- so, Andrew will fill in the ASRAC Committee as we go through.

Typically, it's worked out that the working group's recommendations have flowed through all the way through ASRAC and to DOE in the form of a Notice of Proposed Rulemaking. This one is a little bit of an odd duck in my mind in that both of these products already have proposals out on the street. So, you all have the benefit or not the benefit of knowing that DOE thinks about these products, but notwithstanding that, we're here to negotiate just like everybody else in the room. So, we have an open mind going into these proceedings.

As we go through, we'll be doing -- and this is more process stuff, but we'll be taking votes on the key issues. Once we establish what quorum is for the group and what consensus is for the group, the voting then becomes very important on how we resolve issues that are presented and that's where the real negotiation will start to take place.

If things aren't going well, DOE can opt to withdraw the task from the group and ASRAC can as well. We hope that's not the case. We really do want to see this through and get to a good point; however, if we don't get to a point of a recommendation to ASRAC, DOE will go forward with the NOPRs that you've seen, then take them to final rules. However, everything done here is in the public record and in the administrative record for these rulemakings and so, obviously, DOE will enter anything here into the dockets and administrative records for those rules. So, even if we don't get to a yes, I still believe lots of good work will be done inside this working group.

Okay, so at this point we have a bunch of slides on the work that our facilitators do. So, I don't know if you want to take this at the podium or take it from there and I can flip the slides.

MS. HOFFMAN: We'll just do it quickly. We did our infomercial before. We can flip to the next one. It's just that we've done more than 50 of these and we're kind of pleased that we were the very first negotiated rulemaking in 1983, long time ago. I just said that we've been doing this for quite a while and have more than 50. Okay, we can keep going, and I'd just mention that the last one was manufacturing housing.

We're assuming all of you are familiar with negotiated rulemaking, but if you're not it's basically a process where the parties that are going to be regulated by the rule get a chance to actually say what they think and the agency that's involved in making the rule can hopefully have a better rule because it has all the information and all of the insights before promulgating the rule. And we can go to the next one.

(Slide.)

MS. HOFFMAN: And as you heard just a few moments ago from John Cymbalsky, if it doesn't work of course the agency can go ahead and promulgate the rule as it wishes, but we've been pleased to see that most of the time the rule that actually comes out in the draft enriched by all of the input from the committee.

(Slide.)

MS. HOFFMAN: This just says why we're doing it. Okay. And now I'm just going to turn quickly to what's a facilitator. Have you all worked with facilitators before? Okay, so we're kind of in between. We don't want to strong arm you. We're not totally laissez-fair because we really want you to work toward a deadline to reach a resolution that you're happy with.

(Slide.)

MS. HOFFMAN: This just gives us a statutory in the Negotiated Rulemaking Act basically says hopefully you're hire us. We're being hired by the Department of Energy, but we do serve at your pleasure. And we basically work with you, and one of the things we're going to try to do today is define a quorum, work on ground rules and define what consensus is.

This looks a pretty well behaved group, but the orderly kind of discussion. We've seen passions that get involves, so if you want to speak this is sometimes a good idea so we can make sure everyone's heard.

(Slide.)

MS. HOFFMAN: And then this just says all the things we do. You'll let us know if we're doing all of them, hopefully, well. We even talk to people off side to see if there are some issues that need to be addressed, but haven't been. We'll be putting them in what's called "the parking lot," which means we get to them, but maybe not if they're not part of the agreed upon agenda.

(Slide.)

MS. HOFFMAN: And then you see the color with body language like this (indicating). We watch that's why we try to do this pairs. If somebody's very negative, we try to find out why. It could be something they eat you know downstairs here, but it might be something that's more important, so we do try to do that. And when the process breaks down, we work on the substance. When the substance breaks down, we work on the process. And when in doubt, we take a break.

(Slide.)

MS. HOFFMAN: And then our obligation as neutrals is by entering the process we're obligated to provide a fair and impartial -- we have a concern and an interest in energy, but we have no stake in this rule and we're here to help you make the best one you can.

(Slide.)

MS. HOFFMAN: And then just some comments for the participants. By entering the process, in a sense, you're agreeing. And there was a whole convening stage we weren't a part of that John and his staff probably spoke to you about to be members of this committee in good standing, both you and your alternates, and so we'll be sort of harking back you know why did you commit to all this time? Well, for a good reason. Thank you.

(Slide.)

MS. HOFFMAN: And this just sort of shows, in a sense, a pictorial of what we're doing, the committee over here, the mediator. Technical advisors we have some over here the DOE has worked with. And the stakeholders who aren't present we're very aware that you all have constituents. You're representatives of groups behind you and we know that in between the meetings you may be talking to them and getting some more guidance and advice, and the stakeholders who are present, and our public as well.

(Slide.)

MS. HOFFMAN: And this just talks about the first meeting. And the hope is that in this meeting we're setting the stage. We're negotiating the protocols, which are the ground rules. We're talk about subsequent meetings and how we'll communicate between meetings. And here it'll be a very compressed schedule. And then if we need smaller working groups, we'll develop those as well. And then this is actually what you heard from John already with his agenda.

(Slide.)

MS. HOFFMAN: And then just your responsibility. We hope by -- you know, what is it, 98 percent as being there? You're here already, so you've, in a sense, said yes. But we hope that you and your alternate will be fully briefed on what's going on so that you can be a participatory member. And then just decision-making and we'll get to that, how we're going to make decisions here. I think that's it.

MR. BANTLE: Good morning everyone.

MR. CYMBALSKY: We're making record time, so either nobody's had enough caffeine yet or I don't know. Okay, so the negotiation process this is just an overview of what we've all agreed to here. So, you know, first of all, there is the DOE's need for full compliance with the statutory mandate, so everyone needs to keep that in mind as we go.

The key here is we're mandated to establish minimum energy efficiency standards that are technologically feasible and economically justified. And we want everyone in the room to walk into it with the idea that they support a consensus rulemaking effort. If you don't, you know I ask you to recuse yourself now. We don't want someone here who doesn't have this goal in mind. It's not why you're in the room. And if you're here for a different reason, the door's over there. Honestly, we really want this to work.

DOE will consider the consensus of the working group moving forward, as I mentioned before.

Whatever comes out of this group goes to ASRAC for vote and then gets passed to DOE. We have a 100 percent acceptance rate thus far and there's no reason to believe that this one's any different.

Again, good faith negotiations, so if you're not here in good faith, again, you know we've had other negotiating committees where I'm not sure everyone was there in good faith. And when that was experienced, it wasn't pleasant for anybody in the room and things just don't go well at point.

We ask everyone that's here to make a good faith effort to provide whatever data they can. We understand that some data is business sensitive and companies won't want to provide that, but to the extent you can under NDAs or other means we think the data that exists or could exist will go a long way to getting us to a good point and a good place for consensus for the working group.

And from DOE's point of view, you could see our technical experts are here. We, in good faith, will provide every means necessary to do any analysis that makes sense for this working group to move it forward. So, DOE has provided that technical expertise and we will, as we go through this, do our best to do the analyses that is asked for by the working group.

And I guess the white elephant in the room is the June 15 date, right? So, we know we don't have a lot of time here and it is two products and one negotiating committee, so it's daunting but I don't think it's something we can't achieve as a group. I think, again, the meetings that have been held previously have probably gotten us a lot of the way where we need to get.

And I'll pause. I see a question.

MR. ROSENSTOCK: It's Steve Rosenstock, Edison Electric Institute.

In the publication and federal notice there was the information about the June 15 deadline. Just as an observer, I was wondering with other negotiated rulemakings they were allowed to go over several months and this one you're only allowing six weeks. Could you describe why there's such a quick deadline for this negotiation?

MR. CYMBALSKY: Sure. ASRAC required it, simple answer, at the charter meeting.

MR. ROSENSTOCK: Okay. Thank you.

MR. CYMBALSKY: Yes. Okay, so we've kind of covered these already, but the key issues for this working group, again, data, data, data. I won't say it enough. Any and all data that could possibly help inform the rulemaking we definitely are accepting of that and will do whatever extra analysis we need to to work this data into it.

We think there are some synergies out there that can be gained by combining these two products into one rule. Compliance dates, obviously, if a manufacturer is making a rooftop unit that has a furnace and air conditioners obviously it makes sense to line those two up. So, DOE agrees with that. I think ASRAC was very clear about that being a viable option.

Then, of course, the standards are a key part of this. I should say what's not on the table here is the test methods, and I think that was very clear in the charter to this group. So, please try as best you can not to drag that into this. Any updates to the test method will be down the road, but they won't be part of this proceeding because we'll never finish by June 15. I think we could all agree to that.

These are the EPCA Factor. So, I mentioned the statutory requirements. I'm not going to go through this. This is old hat for most of us, but we still need to do this. Even though this is a negotiation, this stuff doesn't just go away. We will be going through all this analysis based on the input and the data we get from this group.

Okay, so we are making really good time. We really are way ahead of schedule, which is good. I expect the Ethics briefing in about three or five minutes, but we might as well go through the first slide.

(Slide.)

MR. BANTLE: Okay. As John and Eileen have referenced a couple of times -- and again, I'm Ted Bantle. One of the major things we have to do today is establish some ground rules for this working group.

Just a few considerations, first of all, what's the role of alternates going to be. We have a few alternates there today. Will alternates be voting members? Will they not be voting members? How will they be address you know during the meeting?

Second, participating, what is the role, not only of the alternates, but of the public? Can a member of the working group bring in individuals from the public to speak? You know can we hand the floor to them? One of the big questions, quorum and consensus, what are we defining consensus as? As you see on the slide, if the group does not define consensus, the default is unanimous. So, that's something we'll come back to.

All right, let's go a little bit through consensus and then we can come back, probably after the Ethics presentation, and actually outline some ground rules.

MR. CYMBALSKY: He's here now.

MR. BANTLE: Okay, then this is a perfect time before we go into consensus. So, we'll transition over to Ethics.

MR. GORDON: Good morning. My name is Wayne Gordon. I work for the designated agency Ethics official for the Department. Her name is Susan Beard. One of the things that our office does is provide advice to designated federal officers regarding their responsibilities in running FACA committees. And today I'm just going to briefly go through what the process is for FACA and how FACA works, and in particular, talk about your roles and responsibilities.

And briefly, FACA is a set of rules and laws that came into affect in the mid to late seventies to address concerns about people having unauthorized access to government officials and having undue influence on the process of developing policies, regulations, and rules.

The FACA rules are really sunshine rules. They're basically notice giving people the opportunity to be heard and they're oriented towards trying to ensure that fair viewpoints are being brought to the government and that those viewpoints are being represented in the rules and laws that are made up through the federal agencies.

In this case, you are all part of a working group for a parent committee, which is called the Appliance Standards Rulemaking Advisory Committee. That parent committee has both special government employees who are actual federal employees and it has representatives on it as well.

Now, in your role as a working group member, you're on a working group which is considered a subcommittee to the parent committee. So, all of your recommendations and what you come through with your working group activities today at some point in the future that will come before the full committee for a vote. And at that point if your recommendations are acted on and voted in, then those will be passed back to the Department and those will be part of the Department's process of implementing potential rules.

As representatives, unlike special government employees, you're not subject to any federal conflict of interest rules. And in fact, the way that the working groups are supposed to act is that you are supposed to be representing the viewpoints of the organizations that you've been appointed from. So, from that perspective, our office when we're advising John on how to deal with potential conflicts, unless there's a serious issue where somebody is specifically oriented and basically espousing the viewpoint of a particular one institute instead of a group or representative manner, unless that's occurring in the working groups our office is not concerned about the conflict of interest issues because you're presentation and what you'll come up with as a product today will be voted on by that parent committee and they'll have the opportunity to either agree with or discount whatever opinions come out of this working group.

So, from the conflict of interest prospective, we're not worried about it, but we did want to make sure that you're aware that there is a conflict of interest rules out there. And the conflict of interest rules for the special government employees who are federal employees are that they're not supposed to act on matters in an official capacity that could affect their personal financial interest.

And as representatives, we're not worried about that. We bring you in here to represent those viewpoints that are important in the rulemaking process. This kind of FACA committee has only been in existence for about two years now, so we are still at the initial stages of trying to make sure that the process is working out correctly.

I don't know. Is this the fifth or sixth meeting?

MR. CYMBALSKY: I think it's the fifth working group.

MR. GORDON: Yes, fifth working group. And we've got a couple more coming up over the next couple of weeks, and I do the same kind of briefing for them.

If there are particular conflict of interest issues that you're concerned about, you should address those with John. And John will call me and he'll say, Wayne, here's something one of the working group members brought to my attention. Is it something we have to be concerned about? And I will do any research that's necessary and give advice according, but if you think there's something going on that is corrupting the process in any way, bring that to John's attention and he'll be consulting with me about it.

Are there any questions about conflict of interest rules or how the FACA process works here? Okay. Thanks very much.

MR. BANTLE: So, back to consensus. So, first of all, what is consensus? There are a number of definitions. The one we like to use at FMCS kind of has three parts. First, it's a group decision-making process. We'd like to see that everyone's heard, that there has been discussion, that everyone's concerns are raised, and the decision might not be everyone's first choice, but it's one that everyone can live with.

So, we're trying to get a solution that may not be everyone's first choice, but it's something that everyone can live with and it meets the interests of all parties. And interests are really your needs, concerns really in the background, whereas a position is simply a proposed solution to a problem.

So, how are we going to reach consensus? First, we're going to ask questions. You're going to raise doubts. You're going to raise your concerns and you're going to offer alternatives. And offering alternatives is probably one of the best ways to work towards consensus. We have a term we often use, and Eileen and I might throw it out at some point during this facilitation, which is that of a blocker. It's the individual who's saying no.

So, first of all, you have to explain why you're saying no, and you have to offer an alternative solution. So, those are the kinds of rules and responsibilities of the blocker. The blocker is a strong person to have to help us reach better consensus, but you can't simply say no. You have to provide a reason and an alternative.

So, how do we like to test consensus?

First of all, you can kind of break it down into five stages, but it's a lot easier to think about it in three: thumbs up, I'm okay with this; thumbs sideways, I'm not quite sure. Maybe I have a question? Maybe there's a clarification. Maybe I just spaced out for a second and need to have the consensus check again; thumbs down, you're a blocker. Remember explain why your thumb's down. Maybe it's a question. Maybe it's a clarification. Or if it's really a strong concern, propose an alternative.

So, throughout this process, we may do two different types of consensus checks. First one might be a temperature check. We haven't reach -- you know we're just in the midst of discussion. This might be a check for understanding. Is everyone on the same page here? Does everyone understand the basic concept we're talking about? And then we will have final consensus checks, which will be a bit more of a formal process. We will record the results of those consensus checks.

So again, responsibilities of the blocker, consensus -- we can skip through the statutory role of consensus, but in this rulemaking process we are urged to use this consensus process and define what we see as a working group consensus to be. And I do say "we." Eileen and I are just here as facilitators, as she mentioned. You know we're not part of the working group itself. And if consensus is not reached, as John said, you know the Department is willing to go forward with their Notice of Proposed Rule.

So, we can go back to the ground rules in the beginning. And Eileen if you could help me out, I see we do have a flip chart, although we don't have any markers it appears. So, thinking about ground rules, I guess the first question if we're going just down the list here is the role of alternates. Any thoughts from the group on the role of alternates -- and John, feel free to speak up. I know you have experience with other DOE groups. That might be a good place to start as a baseline.

MR. CYMBALSKY: So, this is John from DOE.

In the past, we allowed alternates on the working group. We understand that folks can't always make every meeting, but from my point of view if someone's going to be an alternate it's fine. We don't want the alternate to just become the member. I know that's happened in the past as well, so we want the primary person to make every attempt. So, we don't want the majority of meetings attended by the alternate, but personally, I don't personally have an issue with having alternates. I don't know if anyone else feels differently.

MR. HURST: I agree, John. I think when we get to the scheduling portion, based on the compressed timeframe that we have it may be a good idea to have alternates, but I agree that the primary should make every effort to be here.

MS. HOFFMAN: Just a note, because this is being recorded --

MR. HURST: John Hurst from Lennox.

MS. HOFFMAN: -- just let everybody know. Thank you.

MR. FERNSTROM: Gary Fernstrom. I'm representing the California IOUs. As an alternate, and having participated in previous working groups, I recommend we accept alternates.

MR. DELASKI: This is Andrew DeLaski. It seems to me that -- I agree with the notion of having alternates, but it seems to me that people should designate their alternates. So, there should be designated alternates. It shouldn't be whoever I sent this time around. And every organization group who wants to have an alternate should say who that is I would say at this meeting or soon after this meeting so that we don't have someone showing up at the third meeting who missed the first two and they weren't briefed, right, so that could be completely disruptive if we have someone parachute in who wasn't fully briefed.

And I think by having a designated alternate that would incent organizations to keep their alternate fully briefed and in the loop.

MR. CYMBALSKY: I agree -- this is John from DOE. And I think the way it worked in at least one of the groups the alternates and the main member often came together to meetings, or they were on the webinar. So yes, I fully expect that the designated alternate be fully plugged in to the process as we move through.

I don't think we need to carry this out too long, unless anyone has a concern with that I'm getting the feeling from the group that we should allow alternates as long as they're designated ahead of time.

MR. DELASKI: I'd just ask the question then just from a process point of view do you want to ask the people to give their alternate by a certain date or today.

MR. CYMBALSKY: Yes.

MR. DELASKI: I also would ask the question of -- so then the presumption then is alternates can vote? Is that what we're saying?

MR. CYMBALSKY: I think that's right.

MR. DELASKI: Okay.

MR. CYMBALSKY: Whoever wants to designate an alternate why don't we all strive for submitting them by the end of the week to me and the ASRAC mailbox?

MS. HOFFMAN: Do you want to make a

resolution?

MR. BANTLE: Should we go through because we haven't defined consensus yet. We'll go through to the end and then we can do a list -- go over the whole list.

MS. HOFFMAN: Okay. But to summarize, it sounds like, and we'll go back. And I'm getting a general sense of, yes, alternates by a certain date, by the end of this week. They can vote. They should be designated and fully briefed. Does that capture?

MR. CYMBALSKY: Yes.

MS. SHOWS: This is Mike Shows with UL. I agree with what everybody said. I think that beyond that the alternate should make every attempt to attend at least via webinar so that they are fully -- as you said, fully briefed there, but I think that that attendance portion is important.

MR. SACHS: This is Harvey Sachs. There is one remaining ambiguity. The alternate may vote in the absence of the committee working group member, not in addition to.

MS. HOFFMAN: Right, vote only once. Right.

MR. FERNSTROM: So, this is Gary for the California IOUs again. At least in our case, we work closely enough together that I don't think it's necessary the alternate be on the webinar every time the appointed member is actually in Washington.

MS. HOFFMAN: Okay. I'm sorry. Who is it, Gary?

MR. FERNSTROM: Yes.

MS. HOFFMAN: Your comment was that?

MR. FERNSTROM: My comment was I don't think it's necessary the alternate be on the webinar every time the appointed member is at the meeting in Washington. We coordinate closely enough together that we know what's going on.

MR. CYMBALSKY: Right. So, this is John from DOE.

We're all acting in good faith here, right? So, the good faith here is that if, in fact, you meet after the meeting and you're fully briefed you know that to me serves as a proxy for that. It's not a requirement. All we're saying is make your best effort to be plugged into the proceedings.

MR. DOPPEL: Paul Doppel with Mitsubishi.

And kind of following in Harvey's thought, which is a dangerous place to go, but wanted to make sure that we understand present to vote and no over-the-phone votes. We haven't defined that, so that might be a --

MR. CYMBALSKY: Right. You'd need to be in the room or -- I think on the webinar is fine by me as a vote.

MR. BANTLE: Thoughts from the group on being able to vote from the webinar.

MR. CYMBALSKY: To me, the webinar is the meeting. You know I don't see that different. If you're like in a foreign country and you're not actually on the webinar and you're just emailing me, I don't think that counts.

MR. FERNSTROM: Again, this is Gary. I guess I should be careful speaking because I'm an alternate and not yet officially authorized to work with the group I guess, but on account of weather and other travel-related constraints sometimes the primary member is not going to be able to make it.

MR. BANTLE: So, the general idea that to vote you have to be in the room or in the webinar.

Okay, moving on, participation -- this is a quick one -- of nonworking group members how to bring them in. Do we have a process? Can any working group member you know pass the mike or give the floor to a member of the public, thoughts on that from the working group? Do we want to set a time limit on that discussion or a process for bringing in outside individuals?

MR. FERNSTROM: Gary for the California IOUs.

I've found in working in these groups that frequently comments and thoughts from the audience are very valuable to the process, so we should allow that.

MS. WALTNER: I was just nodding in agreement with Gary.

MR. BANTLE: Not a problem. And do we want to set out any structure for that process, a time limit, a process for nominating individuals, or just see how it goes?

MR. SACHS: This is Harvey Sachs, ACEEE.

I think a number of us have been in multiples of these things and have found that the commitment to courtesy is meant that this was an easy flow of useful and interspersed comments from outsiders, from non-working group members as they came up and everybody was well behaved about it, so I'm not sure we need any rules.

MR. BANTLE: That works?

MR. DELASKI: This is Andrew DeLaski.

I guess I just would also say that I'm counting on -- that I think we're counting on you, as the facilitator, to ensure that no one monopolizes too much time, right? You know I think we have facilitators here, in part, to manage that process so that we don't get someone who's standing up 15 times to read the phone book or something.

MR. BANTLE: And we will do that. We'll make sure to do that.

Okay, moving on, quorum. I believe the

working group is 15 members. In the past, our past experience we set a quorum at 12, 75/80 percent. Suggestions from the group?

MR. MCCRUDDEN: This is Charlie with ACEEE.

And I want to go back to the alternate before we get going too far.

MR. BANTLE: Okay.

MR. MCCRUDDEN: Is there a difference then between an alternate who may vote for you and a proxy vote that you may hand over for a specific meeting or a specific time period to another voting member?

MR. CYMBALSKY: Yes, that is very different. Yes. So, we're not going to allow proxy votes. Normally, we don't allow that.

MR. MCCRUDDEN: Have you ever allowed proxy votes at least?

MR. CYMBALSKY: No, we have not.

MS. HOOTMAN: Jill Hootman, Trane.

You're defining proxy different than just an alternate that is there engaged in the meeting. Okay.

MR. CYMBALSKY: Right. A proxy vote, in my mind, the way Charlie described it was I got to go to the bathroom. Bob, when they vote, vote yes for me.

MS. HOOTMAN: Got it.

MR. CYMBALSKY: Yes.

MS. WALTNER: In the pumps negotiation, there was one time when there was massive flight delays, I believe, and people were calling in -- members were calling in on their way and I think we ended up doing some proxy votes during that time for members that had been on the phone and then emailed their votes into us. So, there was one time when we did it briefly. I don't know if you want to allow that here or wait until -- hopefully, there won't be massive flight delays.

MR. CYMBALSKY: You know from my point of view ^^^^ this is John again from DOE.

So, I know the parent ASRAC committee when we had a couple members who couldn't make it they had sent me an email of their vote and I read the email on the record for the record. You know if we get into that situation to me that's different than me just telling Bob to vote yes because I don't -- you know not that I don't trust Bob. I do. But you know I think it's a little different, in my opinion, but you know I don't have a strong opinion. I think everyone here is on the up and up for getting this done, so you know.

MR. DELASKI: Andrew DeLaski.

My preference would be to not officially sanction proxy votes. I think that in the event that something like this happens then you manage it in that moment. You know if it's a close -- I suspect it wasn't a close issue, right? If it was a close issue, I wouldn't want to be handling a close issue with people emailing things in from the airport. And I told Bob yes, but he said no by mistake. You know that's what you don't want to have happening and I think that's the risk you take if you sanction it. I would say better not to sanction it. If we run into a situation where people are stuck in an elevator or whatever then you work it out.

MR. MCCRUDDEN: This is Charlie with ACCA.

I raised it because I think that's with the compressed time schedule that we have -- and I have a sense that when we come to the calendar we're going to find that -- you know like I know specifically one week in May when I can't be here and I have no alternative option because my alternatives won't be here either because we're all somewhere else. And I recognize that this situation -- the elevator situation too is -- so you're saying that you would not exclude the potential for a situation where we could --

MR. DELASKI: Let us know where you're at, Charlie. You know that Charlie's got big concerns about this, communicate that to the group, but you're not going to get to vote I guess is the thing, but the group would be doing it with knowledge that you had an issue, right?

MR. MCCRUDDEN: Sure.

MR. DELASKI: And that would be --

MR. MCCRUDDEN: So, you're reserving that possibly that this could occur.

MR. DELASKI: Right. Yes, you would

communicate with us.

MR. BANTLE: Eileen, did you capture that discussion?

MS. HOFFMAN: Yes. I just want to make sure.

MR. BANTLE: And you might want to come back to it.

MS. HOFFMAN: A proxy vote not allowed, but that may be too definitive here, but it sounded like that was what I was hearing; but that doesn't preclude communication, concern and other things. Was that what I heard?

MR. BANTLE: Charlie, I think you're coming from a different point there.

MR. MCCRUDDEN: This is Charlie with ACCA.

I guess the sense I got was that we're not going to official allow proxies, but that if circumstances arose and if it was communicated in a way it would be allowed. So, we're not actually saying on proxies. We're saying we don't essentially have a proxy policy or maybe we're saying we have a proxy policy, but that it could have certain exceptions.

MR. BANTLE: And Andrew is what you were saying that the concerns of the individual who wasn't present would be addressed, but the individual still would not have a vote?

MR. DELASKI: Right. That's what I was suggesting.

MR. BANTLE: Okay.

MR. DELASKI: You know I think that it gets to -- we're going to get the consensus here in a few minutes, right, but if we're going to get to a rule proposal that's going to -- I mean our consensus definition and we know Charlie's got big issues, then it would've been good as a vote, even though officially we're not letting you vote, right, since you don't -- slippery slope of proxies.

MR. BANTLE: Any other comments from the group?

MR. DOPPEL: Paul Doppel, Mitsubishi.

So, I think what everyone is saying is that it's not really proxy voting that we're talking about, but special voting during extenuating circumstances is more what we're going to --

MR. CYMBALSKY: Right. So, I'm hearing two different scenarios, the one is you know the weather turned bad and everyone was at the airport and they're communicating via email their vote. To me that's not a proxy. I'm reading their votes, right, and they're entered into the record versus you know Charlie's disappears to Hawaii in May and before he left he told Bob to vote no on everything. You know, to me, that's the proxy that we're trying to avoid.

MR. MCCRUDDEN: This is Charlie with ACCA.

And for the record, it is Asheville, North Carolina.

MR. CYMBALSKY: Well, that's a nice place. I want to go there.

MS. HOFFMAN: Well, let me just summarize. Special voting during an extenuating circumstances will be decided on a case-by-case basis or just -- I don't know. I'm just trying to figure out how to capture what's been said. Proxy voting will not be allowed, but special voting during extenuating circumstances; is that what I'm hearing?

MR. CYMBALSKY: Yes.

MS. HOFFMAN: Okay.

MR. BANTLE: Thank you, Eileen, for capturing that.

Okay, moving back to quorum, I had thrown out the suggestion, based on our previous working group, of a quorum was 12 out 15. Paul informed me that I was incorrect. We have 17. So, just kind of working with that, any suggestions from the group on defining quorum?

MR. CYMBALSKY: This is John from DOE.

So, quorum is just the number of people we need to have a meeting so it's an official meeting. And so we want to be careful here with what we decide, but generally, 75 to 80 percent for the full ASRAC.

MR. FERNSTROM: So, this is Gary.

Members on the webinar are considered to be present?

MR. CYMBALSKY: Yes.

MR. HURST: This is John Hurst with

Lennox.

I don't see any reason to deviate from what's been successful in the past, so if that's the guideline I think that's what my opening position would be.

MR. CYMBALSKY: I mean I would just throw out 75 percent or more. I know we don't have a number of people that'll equal 75 percent.

MR. DELASKI: So, let's do the math so we know what we need, right? So, 75 percent -- where's an engineer?

(Laughter.)

MR. BANTLE: So, that would 13, including members that are on the webinar.

MR. CYMBALSKY: So, not less than 13?

MR. BANTLE: Yes.

MR. CYMBALSKY: I think we should probably just go with 12 just because it's actually some fraction of it, but it could be a problem getting 12 people -- well, maybe not with the number of meetings, but if it goes on longer that would be a problem.

MR. DELASKI: But the concern I would have is you know if we have a participant or two who decides you know this actually wasn't really worth my time after all and they just start not showing up, then we have a quorum problem. So, that's the one I think that concerns me is if we've got 17 you know if there's the potential that someone just drops out and doesn't actually resign, then we could deal with it then.

MS. HOFFMAN: Then do you want to go with 12 rather than 13?

MR. DELASKI: Seventy and a half percent. I'm fine with 12.

MR. CYMBALSKY: Okay. Fine.

MS. BANTLE: Twelve, including webinar members.

MS. HOFFMAN: Right.

MR. BANTLE: Okay, next thing on the list is consensus, thoughts on consensus. Previously, again, going with what we've worked with in the past, we had no more than three no votes on a vote, and that's out of the quorum the amount of people that can vote on that day, not out of the total group, thoughts on that? So, a fourth no vote would be no consensus.

MR. CYMBALSKY: So, this is John from DOE.

So, the way we've done it in the past with voting, so we just looked for "no's." We didn't actually have to vote yes. So, this is a very important distinction. You know to get that four people they would absolutely have to say no. An abstention in this case does not count towards that number. So, to me, that's important. And remember the rules. If you vote no, you have to say why and you have to offer what your solution path to a yes is.

So, from my point of view, you know I think this is a good going in position, but you know, obviously, this is very important, the most important vote you'll have today maybe.

MR. FERNSTROM: So, this is Gary.

Just an observation, looking around the room it looks to me like we've got individuals that are environmental advocates here, if you include the

California Utilities in that, and it would take unanimity among the advocates to block in order to get four votes. I forgot Harvey. I'm sorry. That changes my comment and the perspective. Thank you.

MR. BANTLE: Any other comments from the working group on consensus?

MR. STARR: I was going to say I think the same kind of rules, at least for pumps in commercial refrigeration, which was three, but I don't know. I guess the math I guess the four could work.

MR. BANTLE: Say it again, Louis.

MR. STARR: It was three, I believe, was the magic number.

MR. FERNSTROM: So, this is Gary again.

Not yet able to vote, but being able to comment, I favor four.

MR. BANTLE: And just a clarification, in pumps three no votes was still consensus or two was still consensus, three was no consensus, so just one less. Okay. Thoughts from the group? Paul.

MR. DOPPEL: Paul Doppel with Mitsubishi Electric.

So, the last group I was on there was a differentiation made by DOE between everyone agreeing and consensus as to what was implied by DOE's action because if it was everyone agreed, then DOE would comply with what was said. If it was consensus --

MR. CYMBALSKY: No, no, no.

MR. DOPPEL: Okay.

MR. CYMBALSKY: So, this is what we're defining here. So, the going in position in the FACA kind of rules is unanimous, right, but the group can change that definition. That's what we're doing here. So, once we change that definition that's what DOE abides by.

MR. DOPPEL: Okay.

MR. CYMBALSKY: I mean from DOE's perspective if it's four or three -- I mean I don't think I personally have a difference with those two, but happy to go either way.

MR. FERNSTROM: This is Gary.

Four going once, going twice.

MR. MCCRUDDEN: I'll say yes. This is Charlie McCrudden. I don't know. It's not auction here.

(Laughter.)

MR. MCRUDDEN: I mean, Gary, you looked around and you sort of looked at your compatriots. I look at my compatriots. I've got myself and SMAKDA number two as the contractor side of things. Now, we probably play a smaller role than the other voting blocks. I'd put in air quotes. But I think that -- you know I don't think I could actually argue successfully that we should go down to two, but I would say I think going to three would be supportive. I can support three. Four I feel like perhaps that there's an issue that comes up and I can't be persuasive and I'm just sort of -- I'm just sort of a ghost here. So, I would support three. I think may be a better -- I think probably the smaller number is -- I still think that would be preferable for us.

MR. DELASKI: This is Andrew.

I think Charlie's proposal is a good one. I also would think that when we report the vote, any vote back to the parent committee that if the report, the actual votes shows this is consensus, but there were 15 yes and 2 no's. Two no's, right, so the parent committee is -- that actually creates a little more pressure to try to get 100 percent if you can. I mean the idea of not having a hundred percent is that you just don't want an outlier to stop -- an outlier or two to stop the process. That's what we're saying.

MR. MCCRUDDEN: And this is Charlie with ACCA.

I agree with that. On the Regional Standards Enforcement I think we had two issues where we could not come to consensus, if I'm not mistaken. And I think on the ones that we did there was a report that there was one no vote, and I think that was helpful for the record probably for the ASRAC to understand what happened during the committee --.

MR. FERNSTROM: This is Gary. Recalling that, I think I was the one no vote, and I was persuaded at the last minute to change my mind.

MR. MCCRUDDEN: No, no, I'm thinking of --

MR. CYMBALSKY: That was pumps I think you're thinking of.

MR. MCCRUDDEN: This is Charlie with ACCA. The one I'm thinking of was --

MR. CYMBALSKY: The PTAX vote on --

MR. MCCRUDDEN: No, no, it was PHCC had voted no on one of the votes that we did on enforcement. That wasn't the PTAX.

MR. CYMBALSKY: It wasn't?

MR. MCCRUDDEN: No.

MR. FERNSTROM: So, I was thinking Regional Standards Enforcement, and I was thinking at the end --

MR. MCCRUDDEN: Yeah, it was the certification of PTAX.

MR. CYMBALSKY: No, I was thinking certification of -- I'm sorry.

MR. FERNSTROM: Certification of a split system residential --

MR. CYMBALSKY: Got it.

MR. FERNSTROM: -- air conditioning. Anyway, we're close I think to agreement.

MR. BANTLE: So, it seems to me we have a three. We have a suggestion on four, and the three was the last suggestion. Thoughts from the group. Comment on the three.

MR. CYMBALSKY: This is John from DOE.

So, using Charlie's example, I think, I think three works perfectly because if his block is two he would need to convince another block to join his side. I think that's the way this thing is supposed to work, so I'm going to say three is my preferred.

MR. BANTLE: Okay.

MR. SHOWS: This is Mike Shows with UL.

So, just to clarify, it's three irrespective of whether it's 12 or 17. It doesn't matter how many people are voting it's just three is the number.

MS. HOFFMAN: Right.

MR. SHOWS: Correct?

MR. CYMBALSKY: Yes, that's the assumption that I've been working under.

MS. HOFFMAN: Right.

MR. SHOWS: Okay. Cool.

MS. HOFFMAN: Should we have a show of --

see if we can try a consensus and see.

MR. BANTLE: Shall we try a consensus on three?

MS. HOFFMAN: If there are three no votes, there's no consensus.

MR. MCCRUDDEN: So, this is Charlie with ACCA.

I hate to go back. Do we need a quorum to start the meeting?

MS. HOFFMAN: Yes.

MR. MCCRUDDEN: So, at 9:00 a.m. we need -- so, we need 12 to start. Okay. Thank you.

MS. HOFFMAN: Yes, Harvey, is that a show of thumbs.

MR. BANTLE: Or hands?

MS. HOFFMAN: Or hands. Yes, thumbs up?

MR. FERNSTROM: So, this is Gary.

Can alternates vote or no?

MS. HOFFMAN: Yes.

MR. BANTLE: Yes.

MS. HOFFMAN: We go back to the -- oh, right.

MR. CYMBALSKY: This is just consensus and then we'll go through the whole list of --

MR. BANTLE: We're going to go back and officially vote on everything.

MS. HOFFMAN: All of the other ones.

MR. FERNSTROM: Okay.

MR. CYMBALSKY: Does anyone say no? Let's do our normal way of voting.

MR. BANTLE: So, consensus is three. Okay, any other suggestions from the group. You all have experience in the negotiated rulemaking process.

MS. HOFFMAN: Do you want to do the vote on the quorum?

MR. BANTLE: Shouldn't we vote on whether or not alternate can vote first?

MS. HOFFMAN: Yes.

MR. CYMBALSKY: So we can include them or not?

MS. HOFFMAN: Yes.

UNIDENTIFIED MALE SPEAKER: Because Gary's vote didn't count.

(Laughter.)

MR. CYMBALSKY: I informed him.

MS. HOFFMAN: All right, so can alternates vote if they're properly designated? We're assuming Gary is, so you didn't just rush in here --

MR. CYMBALSKY: Any no's? Raise your hand if you're a no.

MS. HOFFMAN: -- wanting to visit Washington, D.C.

MR. BANTLE: On alternates. And I see no no's on alternates.

MS. HOFFMAN: All right, and we're talking designated alternates, fully briefed.

MR. CYMBALSKY: In good faith, though, fully briefed or on the webcast.

MS. HOFFMAN: And that you'll let us know the name of the alternate hopefully by the end of the week.

MR. CYMBALSKY: Correct.

MS. HOFFMAN: All right, so all in favor?

MR. BANTLE: 100 percent.

MS. HOFFMAN: A hundred percent. Okay.

MR. BANTLE: Correct. Harvey, do you have a comment?

MS. HOFFMAN: Also, for outside comments they're allowed.

MR. BANTLE: A lot of discretion with the working group. And Eileen and I as facilitators will keep track of that.

MS. HOFFMAN: And we in other reg negs have said if you wanted someone from the outside you'd introduce them. In other words, so it wasn't just a public -- we will have time for the public to speak, but if you want somebody you would be the member saying I'd like "X" to come up and speak.

MR. SACHS: This is Harvey Sachs.

I think what we're trying to say is most of us have felt success with the participating coming with the flow instead of having to back up and go forward and back up.

MS. HOFFMAN: Okay.

MR. SACHS: So, I think we're less turns out to have problems I think.

MR. BANTLE: Yes, as it naturally arises, I'd like to recognize so-and-so to just add a little incentive.

MS. HOFFMAN: Okay. Proxy vote generally not allowed, but special voting during extenuating circumstances; is that what I heard? Now, we'll interpret that is another issue, but was that --

MR. FERNSTROM: This is Gary.

My understanding of the term "special" the way John characterized it was the member voting, but through an alternative to the normal means. For example, by email or telephone.

MR. CYMBALSKY: Which is different, by definition, than a proxy vote, in my mind.

MS. HOFFMAN: Okay. All right, is there an agreement on that?

MR. BANTLE: Can we get a show of hands on that one, any no votes?

(Vote taken.)

MS. HOFFMAN: Okay.

MR. BANTLE: Is that the end of the list, though?

MS. HOFFMAN: The quorum.

MR. BANTLE: Okay, quorum. So, we have

quorum set at 12, and that includes remote participants. Show of hands any no votes?

(Vote taken.)

MS. HOFFMAN: Okay.

MR. BANTLE: Okay, I didn't see no no votes.

Okay, that covers kind of the major rules. Any other suggested rules just from your previous experience that you'd like to add to the list -- and we will type this up and disseminate it.

MS. HOFFMAN: Yes, many of you have served on other committees. Is there some ground rule you want to make sure we have in there?

MR. FERNSTROM: This is Gary.

My observation has been this is the quickest we've ever come to agreement on these things.

(Applause.)

MS. HOFFMAN: Well, thank you.

MR. BANTLE: So, we will move forward with this list.

MS. HOFFMAN: Okay.

MR. BANTLE: We will obviously memorialize those. If at some point in the process something is not working for anyone you know that's why Eileen and I are here.

MS. HOFFMAN: Right.

MR. BANTLE: Bring it to our attention, and us, as facilitators, can address that.

MS. HOFFMAN: Right.

MR. BANTLE: Okay?

MR. DELASKI: Andrew DeLaski.

This isn't a ground rule, but I guess I'm back to this notion that if anyone finds themselves not participating I just would ask that they should resign I guess.

MS. HOFFMAN: Okay.

MR. DELASKI: I would hope that people if they find themselves unable to fulfill what the committee's going to be doing that they should resign.

MS. HOFFMAN: Okay.

MR. DELASKI: It's not a rule, but I think it's a courtesy.

MR. CYMBALSKY: You know and I said that in my opening pretty strongly and I mean it. I mean you know don't bring the New Yorker out in me, but I really feel that you know we're all committing a lot of time. And if you're not going to be one of those people to commit as well just do the right thing. Spend your time the way you want to spend it.

MR. BANTLE: Thank you.

MR. CYMBALSKY: So, we're at a point now where we could take a quick break and then do scheduling, or we can hammer it out before 10:30 and break at 10:30. Anyone have a strong preference?

MS. HOFFMAN: So, we'll see you about 10:30.

MR. BANTLE: 10:30, about 15, 20 minutes.

(Whereupon, a break was taken at 10:11 a.m.)

MR. CYMBALSKY: Okay, let's get started again. There were a few points on ground rules that we noticed from one of the other working groups that are probably pretty important to cover here, at least from the Department's perspective. And so now that we've defined consensus we can actually take votes on some of these concepts.

You know I talked a little bit about at term sheet, and so at the end of this process there'll be a term sheet that will be floated up to ASRAC. We're going to be taking notes as we go. We're going to record every vote, and we're going to create this term sheet. And at the end of the process we'll go through it and make sure everybody's happy with it. That's what will be passed forward to ASRAC to vote on. So, DOE agrees to take this term sheet and incorporate it into a NOPR.

And then we get into the interesting part down here that we're going to need to all vote on. So, it's Letter "C" through "F" here on this page. So, I'm just going to read the statement for the record.

So, no negative comments, each party, except individuals that have previously voted negatively on the final agreement agrees not to file negative comments or to speak negatively on the proposed standard or its preamble to the extent they have the same substance and effect of the term sheet.

So, in layman's terms, what this means is if you didn't vote no you should not also file negative comments to the thing t hat you didn't vote no on. And so, I'm going to throw that out there for a vote. Are there any no votes to accepting this into the ground rules?

(Vote taken.)

MR. CYMBALSKY: Okay, seeing none, response to public comments. DOE will consider all relevant comments submitted concerning the NOPR and will make such modifications of the proposed standard and its preamble as are necessary when issuing the final standard.

So, what that means is we'll take the term sheet, but obviously that go into some sort of a public document where DOE will receive public comments. What we're saying here is that we will incorporate those public comments into that rule.

We don't have to vote on that. We're just saying we're going to do that.

"E," no adverse action and support each

party, except individuals that have previously voted negatively on the final agreement agrees not to take any action to inhibit the adoption of the recommended proposed standard as a final standard to the extent the final standard and its preamble have the same substance and effect of the term sheet.

So, here's it a little different because we already have NOPRs out. So, what comes out of this process, depending on what's decided, it could be a final rule. It could be a -- NOPR, but it'll be the term sheet that this group votes towards. So, what this says here -- again, it's very similar to "C," but it also goes a little bit further that you'll agree with what is in the Notice. So, anybody have any thoughts here, concerns, no votes?

(Vote taken.)

MR. CYMBALSKY: Seeing none on that -- and then finally, no challenge. So, each party, except individuals that have previously voted negatively on the final agreement, agrees not to take a position materially inconsistent with the standard or determination in court or in other forum to the extent that the final standard or determination and its preamble have the same substance and effect as the term sheet for a period of one year from the effective date of the rule or rulemaking determination. So, this is let DOE's big get on this process.

MR. DELASKI: John, one question, what do you mean by effective date?

MR. CYMBALSKY: So, the effective date is 60 days after publication.

MS. HOOTMAN: Jill from Trane.

Just to understand that a little bit more, when you say 60 days after publication of the term sheet and then one year from that; is that the counter?

MR. CYMBALSKY: So, 60 days after publication of whatever the rulemaking document that comes from the incorporation of the term sheet.

MS. HOOTMAN: Okay, so the NOPR.

MR. CYMBALSKY: For a final rule.

MS. HOOTMAN: Right.

MR. CYMBALSKY: Usually, I could just say

NOPR because we hadn't had one yet, but since we have NOPRs for these rules technically, we could get a final rule out of this.

MS. HOOTMAN: Got it. Okay.

MR. CYMBALSKY: Frankly speaking, but it all depends.

MR. DELASKI: John, can we just pause on that for a second. I think it's worth, sort of emphasizing this point. So, the next step from a federal regulatory perspective it can't be a NOPR because you already have a NOPR out. It would have to be a supplemental NOPR.

MR. CYMBALSKY: Right.

MR. DELASKI: Or it could be a final rule provided that it meets the legal requirements, that the NOPR gives you a sufficient basis for that final rule.

MR. CYMBALSKY: Exactly, that it is a logical outgrowth of the NOPR.

MR. DELASKI: Right.

MR. CYMBALSKY: And it's comments. That's sort of the litmus test. But we haven't started getting into the nitty gritty, so we honestly don't know that, but whatever that document is that's what this statement pertains to. So, any no votes on this?

MR. BANTLE: Any questions?

MS. WALTNER: This is Meg Waltner. And I have a question, where did the one-year period on this one come from? It just strikes me as strange. You know in this process maybe this doesn't matter, but if we were to do sort of a NOPR and then a final rule out of this process it could fall out of the one-year timeframe.

MR. CYMBALSKY: Right, again, I'm just reading from a previous set of ground rules. We can change that if that doesn't sound -- should it be two years?

MS. WALTNER: I don't have a proposal. I just -- yeah, I don't know I just think a bad timeframe.

MR. CYMBALSKY: Yes. I mean it seems to me if I was not DOE and I was another member I'd say, well, what I'm really you know voting on here is the product that comes out of this committee, whatever it is and you're not committing to something that might be after that because you don't have that certainty that that was what you voted on, so I would think we would want to restrict it to whatever this group decides.

Now, if it's the one-year or two-year you know that's not something I'm particularly wedded to in any way, shape, or form.

MR. BANTLE: Any alternative solutions or timeframes from the group?

MR. CYMBALSKY: Okay, show of hands. Again, raise your hand if it's a no on the one-year.

(Vote taken.)

MR. CYMBALSKY: The rest of the stuff we kind of went over already, so I think we're good on ground rules, unless somebody else -- you know this may have spurred some other thoughts in people's minds. Rusty?

MR. THARP: This is Rusty with Goodman.

Looking back to the commercial certification, one thing we addressed was subgroups just in case. I don't know if we want to develop some subgroups I don't know if we need to address this at this point in time or not, but I think you might want to.

MR. CYMBALSKY: So, that's on this document too. I'll post it up here. So, what we just said that subgroups could be formed, no more than 15 people on a subgroup, and as needed, DOE would provide technical support to the subgroups. That's something you know we will do regardless of needing it to be in the ground rules or not, but if you want to memorialize it in the ground rules I'm okay with that.

MS. HOFFMAN: And I believe some members of the subgroup don't have to be members of the committee. They can be experts, whatever.

MR. CYMBALSKY: I mean it just says here that the subgroups are not authorized to make decisions for the working group as a whole. I think you know the idea here is the subgroup would report back to this group.

MR. WHITWELL: Bob Whitwell from Carrier.

So John, Eileen mentioned that the subgroup could consist of people from outside the working group; that's correct?

MR. CYMBALSKY: So, I think the subgroup could rely on extra technical expertise. I think I might differ with the approach. I think that the subgroup members could be members of the committee. I don't know if anyone else has some thoughts.

MR. DELASKI: This is Andrew.

It seemed to me that if you get someone who has expertise and you want to bring them on the group whether they are -- since this is a nonvoting group anyway, they're just going to report back to the actual whole authority, which is this committee. It's almost a distinction kind of difference. Whether they're on the group or not in the group, they're in the meeting. They're contributing. Call them one group. I don't think it matters.

MR. CYMBALSKY: Okay, my only sense is it seems -- I don't know how we could you know make people do work if they're not kind of part of the group, but I'm okay either way. You know I would think -- you know the way it worked for transformers the subgroups that were formed were all members of the working group. They brought in technical experts to help guide them and that's fine, but I think this group should appoint members of this working group to be the members of the subgroup.

MR. WHITWELL: Okay, so it would be members of the working group that are the subgroup, but we could bring in other people --

MR. CYMBALSKY: To assist.

MR. WHITWELL: -- to work with the subgroup.

MR. DELASKI: That makes sense to me.

MR. WHITWELL: Yeah.

MR. DELASKI: Because I'm thinking about you and Dick, for example. Dick's there with you, but you're there too because you're going to carry it back to the group.

MR. WHITWELL: Exactly.

MR. DELASAKI: That's your job.

MR. WHITWELL: That's what I was looking for.

MR. CYMBALSKY: I think that's the way it should work.

MR. DELASKI: Okay, I'm good with that.

MR. CYMBALSKY: Okay. So, if everyone's okay I mean we could adopt this language wholesale.

MR. BANTLE: And we do have the 15-person number there. Do we want to leave it so it gives us the freedom, thoughts from the group?

MR. CYMBALSKY: Well, we only have 17.

MR. BANTLE: Yes, we only have 17 people total that's why it came to my attention.

MR. DELAKSI: If it's more than 15, it's not a subgroup.

MR. BANTLE: Yes. But probably something that doesn't necessarily need to be changed at the moment.

Okay, a vote on accepting this language as is on the board. And just raise your hand if it's a no again. We'll follow our consensus.

(Vote taken.)

MR. BANTLE: No no's.

MR. CYMBALSKY: Okay. Great. Any other

issues from members of the group? I mean we've got everything here already; consensus, quorum, subgroups, and we've gone through the agreement.

Okay. All right, so we'll go now back to the part trying to schedule some meetings I think is the next topic.

MR. BANTLE: Correct.

MS. HOFFMAN: Does everyone have the doodle results?

MR. BANTLE: Okay, the days were outlined in the doodle May 11, May 12, May 21, May 22, June 1, June 2, June 8, and June 15. Now, we do have the votes.

John, I believe the percentage in there was including facilitators. Correct?

MR. CYMBALSKY: Right.

MR. BANTLE: So, that's not necessarily a quorum even though it does show 12. Any comments on those dates, strong aversion to any of the dates in particular? We can start at the beginning, the May 11, May 12?

MS. HOFFMAN: You also may want to get the votes from these folks.

MR. BANTLE: Correct. I think some of them are alternates.

MR. SHOWS: This is Mike Shows with UL. I missed the doodle. Sorry about that.

MR. BANTLE: Okay, no problem.

MR. SHOWS: I'm transferring from Asia, but all the dates that are there I would be available for.

MS. HOFFMAN: Good.

MR. BANTLE: Okay.

MR. CYMBALSKY: Charlie, I know you're heading to North Carolina. Do you want to be a little more specific on when that --

MR. MCCRUDDEN: It's the week of May 11.

MR. CYMBALSKY: It is?

MR. MCCRUDDEN: Yes. So, I'm just looking at my calendar now. Monday is my travel day. Tuesday I can certainly be available in the afternoon and do what I can in the morning. I'm going to try to work around on Monday.

MR. BANTLE: Any of the other dates.

MR. MCCRUDDEN: I haven't even gotten that far yet.

MR. BANTLE: No problem. One first question, we'll focus on the May 11 and 12th -- and this is also to John. Those are coming up quickly. What will be discussed? Are we going to have enough to discuss on those first two dates, which is I think what I'm trying to get to?

MR. CYMBALSKY: Yes. So, we have it here.

(Slide.)

MR. CYMBALSKY: So, on the screen this was something we put together without really cross-referencing the doodle poll, but sort of outlines what we think -- how things are going to move without the benefit of learning what we might learn this afternoon. So, obviously, this is just a straw man, but this is something the team thinks is something they can do analytically to help move things along.

So, personally, I think -- you know Charlie's schedule notwithstanding, the 11th and 12th are two critical next dates in my mind. Obviously, I think next week is probably too soon, but I think in two-weeks time I think is a good spot to get us back in the room. I know there were other conflicts later in the week for at least a couple of us.

MS. WALTNER: So, just a question, that 5/7 date is definitive as to when we'll have the updated --

MR. MILSLAK: I mean the goal is to have it done by the end of this week or possibly early next week, so that should be possible. The members are all getting it together now.

MS. WALTNER: Okay.

MR. MILSLAK: Nick.

Just to follow up, I know there was an earlier discussion there was a question of the members having it done and then you guys at -- having to anonymous it.

MR. CYMBALSKY: Right.

MR. MILSLAK: But that shouldn't take very long to do. I mean once we have it we can compile it and it should be a pretty quick process once we get the data from the members to do it. Your expectation is that you'll have the data from members at the end of this week; is that what you said?

MR. CYMBALSKY: Or early next week.

MR. MILSLAK: Okay.

MR. BANTLE: So, specifically, we're looking at that 11th and 12th. Louis, I know you were one that we didn't have your info.

MR. STARR: Yes. So, the 11th and 12th is fine.

MR. BANTLE: Okay. And then we're also missing information from Marshall and Karen, who we have alternates for today. I don't know if you can speak to any availability.

MR. FERNSTROM: So, this is Gary for the California IOUs and Marshall.

All I know at this point is that Marshall will be back from Italy on May 8, and any time subsequent to that at least he'll be in the country.

MR. CYMBALSKY: Thank you. So, Paul will you have an alternate for the 12th do you think?

MR. DOPPEL: It depends on the flight. I need to be someplace on the 13th, so I may be able to make a good part of the day.

MR. CYMBALSKY: Okay.

MR. DOPPEL: And then I'll get a proxy.

MR. CYMBALSKY: I'll give you a proxy. And then Andrew, I guess the same question to you.

MR. DELASKI: I'm in town the 12th. I'm just speaking at another event.

MR. CYMBALSKY: Okay.

MR. DELASKI: So, I should be in and out.

MR. CYMBALSKY: Okay. Good. All right. So, Charlie -- I don't want to say "Sorry Charlie," but do you think it's possible that there's anyone that can --

MR. MCCRUDDEN: Yes, I'll make something happen.

MR. CYMBALSKY: Okay. Great. So, why don't we book the 11th and 12th? Block that.

MS. HOFFMAN: And is it exact 9:00 to 5:00 both days. I'm looking at travels.

MR. CYMBALSKY: It doesn't have to be. We have the room from 9:00 to 5:00.

MS. HOFFMAN: Yes, I understand.

MR. CYMBALSKY: We might be able to start a little earlier to get people out the second day earlier, but you know why don't we be flexible on time?

MS. HOFFMAN: I was going to say I would like it on the second day if we could be like an 8:00 to 4:00 because I can get a flight, better choices if I'm out of here by 4:00.

MR. CYMBALSKY: Okay, so why don't we just say we'll end at 4:00 on the second day and we'll work on the start time.

MR. SHOWS: Hey John, I got a question. Mike Shows with UL.

The week of the 25th I'm seeing an in-person meeting there, but I don't see anything on this list that week.

MR. CYMBALSKY: Right. Again, these two were created in separate parts of the country. So, what the team was doing was using their kind of work schedule when they can get things done as opposed to when Memorial Day might fall on the calendar.

MR. BANTLE: So, we were looking at the

21st and 22nd.

MR. CYMBALSKY: Right.

MR. BANTLE: Okay. And does that still work with the team's deadlines?

MR. CYMBALSKY: Yes, I think a couple days isn't going to make or break it. I'm seeing my overtime charges go up. We're still solvent at the current moment. So, looking down at the doodle poll again looks really good there, and then just the same questions to Michael. Michael said he was good on all of them. Louis, the 21st and 22nd?

MR. STARR: Yes. I prefer not the 22nd.

MR. CYMBALSKY: Again, we can get out early that date. I know it's a Friday.

MR. STARR: I have to get to Washington State, but I can make work if we can't do some -- the 22nd is really the only problem I have with the whole schedule, but it would be great if we could push that back to Wednesday and Thursday, but if we can't I can make Friday.

MR. CYMBALSKY: Well, I do have the room available on the 20th.

MR. BANTLE: Yes. So, I think we're looking at maybe the 20th and 21st?

MR. THARP: This is Rusty with Goodman.

I'll be in Mexico on the 20th, but I could, if it's best for the group, I could have my alternate attend that day.

MR. CYMBALSKY: Would the group prefer the Wednesday/Thursday as opposed to the Thursday/Friday.

MR. THARP: It is Memorial Day Weekend. Wednesday/Thursday is going to make travel plans easier for those who have to travel.

MS. WALTNER: Yes, I think some of us would actually like to stay in the area.

(Sidetalk.)

MR. BANTLE: Okay, temperature check from the room, 20/21, just show of hands.

(Show of hands.)

MR. BANTLE: And this would be a yes, not a no.

MS. HOFFMAN: A yes?

MR. BANTLE: Yes, a yes for 20/21. Okay.

MS. HOFFMAN: Either one is fine.

MR. CYMBALSKY: Okay, so let me book the room.

MR. BANTLE: Okay, so we will make that change.

MR. SHOWS: I'm still trying to cross-reference these two documents. So, this week of 5/18 there's an attempt to have a webinar for that week.

MR. CYMBALSKY: Right. So, I kind of skipped over those sections now because I want to go back to that once we get into the content this afternoon to see -- personally, I'm still not comfortable where we are right now because I haven't actually gotten a readout from the last two days. That would help.

So yes, we can put a placeholder there, but if you don't mind maybe we can just lock in the in-person meetings -- yes.

MR. BANTLE: Okay, so then one and two are the next dates on the Google Doodle. And just looking at the numbers, in the Google Doodle these were a little lower, so we want to get this firmed up.

Michael was all the way through. Louis, one and two?

MR. STARR: That's fine.

MR. BANTLE: Okay.

MR. CYMBALSKY: Meg, do you think you could have an alternate?

MS. WALTNER: I will work on that. I definitely can't --.

MR. SHOWS: Hey John, the only change for me is the week of the 11th of May. I'm going to have to do that via webinar. I'm not going to be available in person here.

MR. CYMBALSKY: That's fine.

MR. BANTLE: Any strong concerns from the group on the first and second?

(No response.)

MR. BANTLE: Okay.

MR. STARR: In general, I guess I don't mind traveling on Sunday, but it always would be better to travel on Monday. I don't know. If everybody else is fine with those days, I am, but I kind of like traveling on Monday and then having to leave on Tuesday and Wednesday.

MR. CYMBALSKY: I do not have a room for June 3, unfortunately.

MR. STARR: Okay.

MS. HOOTMAN: I was going to say I understand what you're saying, but I could not participate third, fourth, and fifth, so I'd have to have an alternate.

MR. HURST: We do have the room for the first and second?

MR. CYMBALSKY: Correct.

MR. HURST: Well, it sounds like we're shot.

(Sidetalk.)

MR. CYMBALSKY: So, just so everyone knows, the May 12 meeting will be at HRI in Arlington. We'll provide more details on it. It's right at the Courthouse metro stop, but the 11th will be here.

MR. HURST: John, will Jeremiah send out an invite calendar?

MR. CYMBALSKY: Yes, we'll put all this on everyone's calendar.

MR. HURST: Thank you.

MR. CYMBALSKY: And we're also going to set up a share point site as well with all of your emails and the alternate's emails for access to all the documents and we'll blast that out as well.

MR. BANTLE: So, the next date on the Google Doodle was June 8.

MR. CYMBALSKY: Okay, so then that's when we're coming into the home stretch and so I have both June 8 and June 9 held for rooms. The question is do we need to book two days or one day when we get to this point in the schedule?

MS. HOOTMAN: That's one of the ones -- I mean kind of like Louis said maybe you know do we make that -- do you start at noon. You couldn't even get here by noon, could you? I don't know from there, so sorry. But we've done it twice now where we're traveling on a Sunday, so that's all I'm just saying is maybe --

MR. CYMBALSKY: So, I have the eighth,

ninth, tenth. I have the whole week room availability, so I'm agnostic to dates.

(Sidetalk.)

MR. BANTLE: Just one note, all of our facilitators, including Javier, we are booked I think the eighth, ninth, tenth, so facilitation would have to be the 11th or 12th, I believe, that week.

(Sidetalk.)

MR. DOPPEL: I can't make it. The first two days of the week I can make, but not the last three. So, you're saying the facilitators can't support that.

MR. BANTLE: Not the beginning of the week, no. I think Eileen's out. And I'm actually out at the West Coast well as, so I'll be flying back, and then Javier can be here starting the 10th, 10/11.

MR. CYMBALSKY: I mean if the group says we need to go the dates they can't make it, we'll make do.

MS. HOFFMAN: Yes, we'll figure out something. We have more staff.

MR. CYMBALSKY: But the 10th and 11th worked for everybody?

MR. DOPPEL: I can't make anything the last three days of the week.

MR. BANTLE: Thoughts from the group? I think it's currently scheduled for the eight/ninth and then there was also the suggestion of the 10th/11th, those two options.

MR. CYMBALSKY: Without the facilitators, can we reach a quorum on the ninth and the tenth? Kind of take what are your days and what are their days.

MR. BANTLE: Ninth and tenth?

MR. STARR: I can support the ninth and tenth. Sure. That's replacing the first and second?

MR. BANTLE: Replacing eighth and ninth.

MR. STARR: Eighth and ninth? Okay.

MR. BANTLE: Okay, any objections to nine and ten?

(No response.)

MR. CYMBALSKY: Okay. And then at that point you know we have the 15th here, but I'm going to vote for maybe doing that on a webinar since it's the last day. I'll just leave it at that unless someone has a strong -- I know Monday sounds like a tough travel day. It might be easier to get the group on the phone if we have to.

MR. MILSLAK: I won't be available then. I'll have to call in from a foreign country.

MR. STARR: Can we go down the list one more time just to make sure everybody's on the same calendar.

MR. BANTLE: May 11, May 12 it's at HRI in Arlington. May 20 and May 21, June 1, June 2, June 9, June 10, and June 15 potentially via webinar.

MR. DELASKI: So, it seems to me -- this is Andrew -- the ninth and the tenth is where the target date we're kind of getting to the final decision.

MR. CYMBALSKY: Right. Those are the important dates.

MR. DELASKI: If you can't make those dates, then you've got to have an alternate.

MR. CYMBALSKY: Yes, absolutely. And then

I think we hold the 15th for cleanup, if necessary, on a webinar.

MS. DELASKI: Yes. I mean the awkward thing is the facilitators who have guided us to that point will no longer be available.

MS. HOFFMAN: We'll see what we can do.

MR. BANTLE: We can put the word out and see what we can do.

MS. HOFFMAN: Yes, I might be able to make it for the 10th. I'm flying to Atlanta for a program, but I can figure something out. We'll work it out. You won't be alone. And if we are, Harvey will facilitate.

MR. CYMBALSKY: And I'll just say the May 21 meeting will be held in the building that I actually work in at LaFont Plaza on the eighth floor. We will obviously put that in writing.

(Sidetalk.)

MR. CYMBALSKY: And you know it's good that this group was first because we have three working groups going on, so we got first dibs of everything.

MS. HOOTMAN: Well, I'll be curious because we nominated somebody else for that, so I didn't know how the overlap still happened.

MR. CYMBALSKY: We basically booked every space there was for the whole summer, so we got what we got.

Okay, so that's good. I think we've got a good schedule planned out for ourselves. We'll circulate all the dates. We'll make calendar entries for everybody. We'll set up the share point site. We'll get the documents out on there. And I think at this point it's actually time to turn to the content portion of the briefing.

Okay, so I'm just going to take us through a few slides where things stand sort of in the regulatory history here.

(Slide.)

MR. CYMBALSKY: You know, basically, this rulemaking kind of kicked off with an RIF back in February of 2013, and we also published a NOPR in September for the air conditioner portion of this rule. Later on, we published the furnace portion.

So, the background here for the unitary AC's -- I'm not going to read through this, but there's basically what the current federal standards are, the mapping of the IEER, and then the proposed federal standard that we put out in the fall.

(Slide.)

MR. CYMBALSKY: For the furnaces, we put out the NOPR back in February. And you could see what the proposal is there vis- -vis where things stand today.

(Slide.)

MR. CYMBALSKY: And so, just to go back, the third bullet here is something that is important because I think a lot of people in the room and people not in the room did a lot of legwork ahead of this meeting in response to the NOPR and tried to think about the analytics to move forward from the NOPR, so I think something we just wanted to point out.

What we're really going to focus in on here today with the content, and I'm going to turn it over to the technical team, is what you see here in the red circles. And so, we'll talk about the engineering analysis more and the energy use as well. So, at this point this is where things turn to technical for someone like me, so I'm going to step off the podium.

MR. WESTPHALEN: We didn't really rehearse this, but I figure this is where the engineering material and Navigant Consulting comes in.

My name is Detlef Westphalen and I'm with Navigant Consulting and we worked on the engineering analysis. Some of our staff also worked on impact analysis and will be involved in some of the later meetings as well.

As John mentioned, there was a NOPR published last fall. There were written comments and public meeting comments provided in the wake of the publication of the NOPR. There were also working group meetings held you know which we participated you know with a lot of the people here in this room and probably that are on the webinar as well.

And so, with all of those comments and all of that input you know we have considered revisions to the analyses that were presented in the NOPR, and the next few tables indicate some of these revisions. And you know we went over some of this with some of you last week in a couple formal meetings, but we just wanted to go through and indicate which of these issues we feel have been resolved and that we can then take the input and run with it and continue with the analysis.

And then for those issues that haven't been resolved certainly those are up for discussion and for the working group here to work on and decide on.

MR. SACHS: Harvey Sachs, ACEEE.

The question in my mind is the top row of Slide 56. Baseline units with EER lower than the current standards analysis based and the approach removed to units that need the current EER. And I guess at some point are you going to be talking a little bit more about the EER to IEER transition?

MR. WESTPHALEN: That is something that we could discuss. We haven't prepared any charts showing the EER versus IEER and the scanner for the different classes. I guess I would ask is there something particular that you'd like to see there?

MR. SACHS: Harvey Sachs again.

I'm not sure. Obviously, anti-backsliding raises its ugly head, but I'm just not quite sure what was done as we made that transition to establish the equivalence and I'm not sure that equivalence is even the right word. In fact, I'm pretty sure it's not between an EER and IEER in terms of projected energy use.

MR. FERNSTROM: So, this is Gary speaking for the California IOUs.

I'd like to follow up on Harvey's thought. The EER is particularly important to us, given the hot weather performance and our need to know that in order to characterize the energy utilization and savings in our hot central valley. So, having a good understanding of that relationship is critically important for us.

MR. DELASKI: This is Andrew.

I think what Detlef is doing now is sort of walking us through changes or potential changes to the analysis, which I think makes this really constructive.

I have a handful of kind of legal questions that I would hope would surface at some point. Maybe I can surface them later today -- now is not the moment clearly ^^^^ so that the DOE legal counsel can be thinking about them so then we know some of the parameters or some of the limits of what we can ultimately negotiate.

And this kind of relates to the EER question you know, but I have time later on today you know to put those on the agenda for Eric to consider.

MR. STAS: Eric Stas, DOE.

I think it might be a nice idea to maybe get some of those on the table before the lunch break so that if any questions stump me then I could have good consultation time. Maybe I can get something back to you or just tell you we have to defer it until the next meeting or something, but you know if I hear what they are that would be helpful.

MR. DELASKI: Well, should I just run through them quickly? Would that be helpful?

MR. STAS: Yes.

MR. DELASKI: The one question is can DOE maintain an EER the way it is? So, tell me how an EER is better and have the EER standard, right, if there's consensus. And the DOE has said in the past it can't do two metrics. For residential air conditioners we have sear and EER now. So, is that a potential outcome of this negotiation in metrics?

Another is could we come up with a standard that goes -- come up with two standards, one that goes into effect in Year X and one that goes into effect in Year Y? So, for residential cloth washers there was a negotiated ^^^^ privately negotiated outcome. Twice this has happened now that the standard goes into effect with one level of stringency in year and another level of stringency some years later, so maybe a relatively modest standard initially and a more aggressive one in a second year?

Related to that is a separate question, but related is flexibility on compliance date. To what degree is the Department legally limited to a particular compliance date. Are we completely free as a committee to negotiate whatever compliance dates we see fit? And I would say that in terms of what's the nearest term we could negotiate and is there some outer limit that would be sort of outside of legal bounds? And I look to the dishwasher more recently was negotiated, and we did a pretty quick compliance date in that case. I think that might be it.

MR. SACHS: This is Harvey Sachs, ACEEE.

The corollary to dual metric is whether recognizing the large difference between the 90.1 approach, which includes prescriptive features and the DOE approach, which shall we say is strongly discouraging. Consensus were to be reached and included some prescriptive features. Is that within bounds for this process?

MR. STAS: I assume you're saying in addition to standard levels, right?

MR. SACHS: In addition to standard levels. And again, this might be something that is simple, but it's conceptionally simple is incorporating the economizing rules for metric standard 90.1.

MR. SACHS: I guess I would add to that, Eric, you know we're asking the context of this committee's work, right, so as an out outgrowth of this committee you know what's in our scope, which may be different -- I recognize may be different than what the agency might decide it could do in a different context and are there things that we have to do differently to do in a particular way?

MR. STAS: Well, thanks for these. These are all good questions, and I sort of anticipated them coming and I try to have others thinking about them, and now I put them squarely before them.

MR. SACHS: This is Harvey again.

And they're not completely off the wall since one of the issues that we've been faced with is the issue of trying to get some correlation, both in timing and in context as we have these multiple paths marching forward with CEC, ASRAC 90.1, and DOE standards. And it's hard for me to keep up. It's probably a whole lot harder for a manufacturer.

MR. DELASKI: Hopefully, you can give us

some initial take, but I hope you can get back the analysis. I think, ultimately, we need to make progress on analysis to basis for discussions.

MR. STAS: Yes. I mean I would say given the weight of these questions I don't know the answer will be forthcoming by after lunch you know, so I think we can go through the substance of all these things and get all the ground rules and everything else going. And hopefully, by the next meeting or in advance of the next meeting should have some answers for you I would hope.

MR. THARP: Rusty Tharp with Goodman.

Along the lines of what Harvey and Andrew were talking about, if there was an agreement that added in some design criteria or two standards for these next rounds that we would agree to, could the second one go away at some point in time? So, the question to follow up is you know if we agreed to a design standard that has technology and goes down the road would we be stuck with that permanently or is that something that could go away, depending on technology at the next round of rulemaking?

MR. STAS: That's a very good question, and I guess my response would be you know you're familiar with the statute's anti-backsliding provisions, so to the extent you're giving energy savings attributable to that design requirement if it's at all possible we would want to look and see whether the new standard that would come after that would make up for whatever you're losing by sunsetting something.

MR. DOPPEL: Paul Doppel.

Point of clarification on this, the right-hand column it says "additional input required." If it says none, I just want to make sure that we're not precluded form bringing these topics up again.

MR. CYMBALSKY: I think these are open for discussion.

MR. WESTPHALEN: Yes. The intent was to represent what we thought we heard in the discussions last week, but clearly, if some of these are still open issues you know we should still put them on the table and discuss them.

MR. CYMBALSKY: So, I think the whole point of these sets of slides is like what Detlef explained is what in our minds we think we got what we need. If we are mistaken, we need to know that now to move forward with the analysis. And then you'll see ones where we don't think we have what we need. So, this is definitely in the light of where the analytical team thinks they are at the moment. And if you don't think we have it right, we need to know.

MR. DELASKI: This is Andrew.

Are you looking for just any feedback on this, or are you going to run us through it or what are we going to do now?

MR. WESTPHALEN: Well, I think the attempt was to go through one-by-one, hopefully quickly, and you know if anybody says stop, we want to discuss that.

MR. BANTLE: Before we move on, Mike, did you have a question?

(No response.)

MR. BANTLE: So, think you want to back up a slide, right?

MR. WESTPHALEN: Yes. So, I'll launch into these tables here. The first issue was there were comments that the tests results that DOE was using on which it based its NOPR analyses were somewhat more optimistic than reality, certainly than rated, and you know the revision here is to base the analysis on the ratings, not the test results.

And then component wattage profiles you know would be developed for the units based on specific models with target efficiency levels. And by component wattage profiles, what I mean is understanding, as you do the EBBR calculation what are the wattages assigned to the different components in those equations at the different load levels in order to get that calculation?

MR. FERNSTROM: So, this is Gary.

I have a question. That sounds fine so long as the test results are better than the ratings, but if it were to work the other way around would you then be looking at the ratings and not the test results?

MR. WESTPALEN: Well, I think one of the pointed comments you made in the written comments to the NOPR had to do with the number of tests involved and the number of tests that you know, as DOE's contractors, had available to us to review in order to determine what is the efficiency level of that unit? You know all of these units that we were looking at you know had results that were optimistic or at the rated level.

MR. WHITWELL: Bob Whitwell from Carrier.

Yes, so that's my recollection is that all of the tests results were higher than the rating. And I guess the other issue is that the EEL levels, particularly like at EEL3 were set based on these tests results that are higher than what the ratings were. So, not only was the analysis done on those higher values, but that it also is what you used to set the EL levels, so I think that's a bit of a concern.

MR. FERNSTROM: Okay, this is Gary.

Okay. Thank you. I understand.

MS. WALTNER: Just to make sure I

understand, so the component wattage profiles those are based on your testing of these specific units or are those manufacturer provided values?

MR. WESTPHALEN: To the extent that we can, we're taking the information from you know the product literature. In some cases, we do have test data. And you know some aspects of those test data we have more reason to believe -- you know makes sense to use, such as you know the control of the power input, which is a fairly low number. And you know the question of whether you have the cooling load measurement correct does not really play very much into you know how that particular wattage impacts the IER measurement. So you know in some cases we're using some of those wattage numbers in what we're doing in our revised analysis. I mean think we've been pretty open in showing where a lot of the information comes from, and certainly you know we can go into the nitty gritty detail if the group wants to.

MS. WALTNER: Thank you.

MR. DOPPEL: Paul Doppel.

The last one it says "Dual path analysis for lower ELs while staging." It says "Consider costs for upgrade," but then additional input is none, so then you're not considering based on what that says. So, that's kind of what I was bringing up before. You know it says additional input none, but then if there's going to be a consideration for cost input then that should not say none.

MR. WESTPHALEN: Well, should we go from the front down and try to check them off.

MR. DOPPEL: Well, I just wanted to point out the fact that that could be a problem on some of these others, that same sort of thing.

MS. HOOTMAN: This is Jill from Trane.

I was going to say if you need us to provide because you will not have that data necessarily. You know so the action is not none you may need us to provide that component wattage. Am I not right because not always it's going to be there to be there for you to use in the literature?

MR. WESTPHALEN: That's correct. And I think you know to some extent we're dealing with you know, as John mentioned, the elephant in the room, the June 15th date. And so you know we may decide, as we look into this, that we cannot collect sufficient information to our satisfaction and then we may reach out again.

MR. DOPPEL: My concern is that by that column saying none is that that -- I mean maybe that should be disregarded.

MS. WILLIAMS: This is Alison.

I just wanted to comment, but the "none" doesn't mean no action. It just means that we think that we have the data and what we need, or we know where to get it. And so certainly, if you all have other things you think you can contribute that's fine. I just want to clarify that it's not intended to mean no action. It just means that we think we have a plan to act upon. So, not that you can't provide input, just we didn't think it was necessary.

MR. WHITWELL: Bob Whitwell from Carrier.

So, Detlef, if you're referring to the previous discussions that were going on between Navigant and some of the AHRI group, right?

MR. WESTPHALEN: That's correct. Yes.

MR. WHITWELL: Okay.

MR. WESTPHALEN: I mean these slides should look very familiar to the people that were involved in those meetings.

So, I guess we're going back to the top here. Any more comment on the suggested revision to the analysis here basing the analysis on the units that actually real units with real ratings whose information can be obtained from product literature?

MR. THARP: Rusty Tharp from Goodman.

One of the things I think you need to keep mind is that there is a very large variance of ER for a given IER and the way a manufacturer may get to a specific rating can vary significantly from one manufacturer to another. And one, as we stated in some of the meetings, I can get to a higher IER by my compression technology, by my E transfer technology, by my air moving technology.

So, just because we set a minimum IER doesn't necessarily mean I'm going to get better air flow. I may chose to do it by heat transfer and compression, whereas another manufacturer may chose to do it by heat transfer and air movement. And another may choose to do it a different way.

Just looking at what's in the docket ERE2013-BT-SDT-007-01 for a 12 IER unit the ER varies -- and this is DOE's analysis from the HIR directory -- anywhere from just about 11 EER all the way up to 12.2 for about 15 IER. It varies from about 12 to 13 somewhere range. It's a very broad range and we need to consider how we address that issue in some of this analysis.

I guess what I'm looking for would be that we consider having -- looking at different wattage profiles in some manner, shape, or form.

MR. WESTPHALEN: So, for each class at each efficiency level instead of selecting a representative unit select how many representative units?

MR. THARP: That's something that the working group would want to come up with is determine how we're going to do that because you know if we went to the 1033 buildings maybe we said. You know

I'm not suggesting this. I'm just saying that one option would be a third would do one way, a third would do another, and third would do it another way. Whatever the technical experts come up with as the most appropriate manner, but that's something that we should be giving consideration to.

MR. ROSENQUIST: Hi. Greg Rosenquist, LBNL.

In doing that type of analysis, right, we're doing the downstream from the engineering and doing the energy use. We are completely dependent upon the engineering to characterize the characteristics of that equipment. So, if you want a different type of equipment analyzed for each IER level, it just puts additional burden on Navigant folks to do that. And again, when I'm raising that that to do that that would take time, and we don't have much time.

So, the whole idea of using a representative unit to characterize that IER level -- I mean I understand your point, Rusty. I think it's very valid, right, there's a huge range -- well, not a huge, but there's a range of EER for a given IER, but given the time we have I think we have to make a decision whether or not we should try to capture that or not.

MR. DELASKI: This is Andrew.

And I'm not sure I'm completely following what you've done. But another way to address Rusty's concern is instead of doing you know a third, a third, a third is get a weighted average at the front end, right, then you get a weighted average that represents the population -- your best shot at representing the population as opposed to a single representative unit.

So, I guess that's the question back to D lift, which is -- so, I mean that's the question, right, do we have a representative unit that's truly representative and how do we know it is?

MR. WESTPHALEN: Yes. I mean that's a good question. And you know I can look at the data. You know what's the fan power, how much power goes into the compressor and you know based on all the analysis I've done on these and say, okay, well, that looks about typical. You know certainly with all the experience we have sitting around the table some of the people will say, well no, that's not really representative. It's more like this.

You know certainly we can get into that level of detail and later on in the presentation I show some of the representative selections, and we can look at those. You know we haven't provided those component wattage profiles for all of them, not expecting to get this far in the meeting, but that's something that we could do. And say, okay, well what do you think. These are representative, or we could do something like say, all right, let's choose an EER that's in the middle of the range at that IEER level and say, okay, well that's where we want to you know target what the unit would be that would represent that IEER.

MR. STARR: So, this is Louis Starr.

To some extent, your model is kind of base model of each one of the EL levels; is that right, for your component wattage profile?

MR. WESTPHALEN: Yes.

MR. STARR: Or is just one right now, I mean, except for EL0 or 1 you assume a certain IER, which was probably the lowest of that then?

MR. WESTPHALEN: Well, we're aiming to match the IEER exactly. And so what that does to the EER -- I mean we haven't been systematic and saying, okay, well if we selected one that was off by .1 on IEER does that mean on the higher or lower on EER.

MR. STARR: Sorry, I didn't mean ER. So, in this case what you probably gone and saw what's the most typical way people -- or is there multiple models at a given EER level that someone got to the same method by two different ways. In other words, kind of what Rusty was alluding to that different combinations to get to that level that's not a typical -- in other words, the typical layout of the units. Is that kind of right?

MR. WESTPHALEN: At the lower IEER levels, particularly for the lower capacity units you know you can look at multiple examples. As you go higher in capacity and higher in IER levels, then you say, okay, well I only have Trane unit here, or I only have a Carrier unit there. And then what'd you do?

MR. STARR: Is there -- part of the units a lot different at the lower level where there's multiple units of how they accomplish that or are they pretty much accomplishing the IER the same way or it's all over the board, and so then that changes your profile?

MS. HOOTMAN: But he's right, there's very few manufacturers at the upper levels. They don't have a lot to choose from. In fact, I -- this is Jill from Trane. Sorry.

I really feel like you know you're going to be surprised when you see the sales data. In fact, there might be some stuff we won't be able to share because there's not enough people reporting in it.

MR. WESTPHALEN: What we're trying to get away from is relying on test data of one unit or analysis that we do that -- you know where all right did we test it to make sure it reached that level and go to actual real units and say, okay, we can agree that these units meet these levels, hopefully, and there won't be analysis on that.

MR. STARR: So, it sounds like the main concern manufacturers have are that perhaps going to overestimate their energy use of certain models; is that kind of what the concern is? And that it may not be representative of the whole class of equipment and you just particularly choose one?

MS. HOOTMAN: Yes.

MR. STARR: Do you think it'll change it that much or -- this is a question --

MS. HOOTMAN: At the upper levels, yes.

MR. STARR: Okay, so at the higher ER levels, but not at the lower ones.

MS. HOOTMAN: No question. At minimum, we have lots of models at minimums right now and they're all achieving it all different ways, so you're probably pretty diverse right now. But at those upper levels, threes and fours, there's very few manufacturers, very few models and it's my opinion that we'll show very few sales at that. So, now you're basing something on a model or a design that was designed not for a minimum efficiency, but some glorious level out there to say that I produced the model that did do that. It was never produced, designed for this kind of analysis to be based on.

MS. WALTNER: So, Jill, is what you're saying that you think at those higher efficiency levels the wattage profiles would vary as much as they do at lower efficiency levels today -- you know that all models were brought up to meet those levels you think.

MS. HOOTMAN: Yes.

MS. WALTNER: For the range and how you get there will cause those -- .

MS. HOOTMAN: Yes. Because exactly like Rusty said they will all be achieved different ways.

MS. WALTNER: Yes.

MS. HOOTMAN: And if you do it by compression, it's going to be a completely different wattage profile than if you do it by air flow.

MR. STARR: I have a question. Wouldn't you think whoever's making a model they're probably doing it one of the better ways currently? So, wouldn't people follow that?

MS. HOOTMAN: No, that was my point is I think there were reasons you did that at the high levels that had nothing to do with making the best design. They had everything to do with, oh, I'm the greatest company out there and I can produce something, and I can do it at this high level. It was not to make the absolute cost optimized, best designed, best energy profile at all. It was for other reasons that those models were made.

MR. GALLAPUDI: This is Chandra from Emerson.

If you look at the sales data, my guess is -- I don't have the numbers on top of my head, but the EL2 and below has 95 percent or so of the sales currently. I'm just thinking that somehow looking at Rusty's table of IER and EER we need to overlay sales and see where the sales was and how the representative unit falls related to the high sales volume.

MR. WESTPHALEN: So, let me try to understand what you're suggesting that at a given EL for a given class we would look at the sales by EER and select an EER that you know that is at the peak sales level?

MR. GOLLAPUDI: No, what I mean was, okay, your EL level was it based on IER or EER? I think it was IER based, right?

MR. WESTPHALEN: IEER, yes.

MR. GOLLAPUDI: SO, if you took at the current sales profile at that IEER level, where would the representative unit land? Is it sold? Is it not sold? I mean I think a representative unit should be something that is sold a lot.

MR. WESTPHALEN: But we would then -- you know somebody would say, okay, Rusty sells most of the units in that -- at that EL, so let's use that as the representative unit. I mean I don't know if we could do that. I mean I would be happy to know all of that.

MR. GOLLAPUDI: It goes back to how you do you define a representative. It goes back to how do you define a representative unit.

MS. JAKOBS: This is Dianne Jakobs from Rheem.

Part of the analysis is for EL level there is technologies associated with that EL level. And I think if you just look at products in the marketplace today maybe somebody skipped over a EL level and took something that was easier to do or you know there were different methods to get at your current rating and you didn't actually step through first coil or first staging, whatever it is. So, we might pick an EER level based on the description.

I don't know. You've kind of defined this hierarchy that may not probably not -- is probably not true when you look at the the products and production.

MR. ROSENQUIST: Hi, this is Greg from LBNL.

I wanted to point out that in the revised engineering analysis it's for the 15-ton unit. There are two design paths for EL1 and EL2. One is for a constant air volume system. One is for a staged air volume system, which I believe the question is does that dictate, more or less, the design of that unit if it's going to the constant air volume versus staged? And if it does, then we're capturing some of this effect already on the baseline notes still characterized with one baseline unit.

So, I guess maybe there would be a possibility to at least choose one more type of a characterization of the baseline, but again, that's a question to deal with.

MR. WESTPHALEN: Yes. I mean you know one thing to potentially suggest is that I mean in all aspects of these analyses there are many different inputs and many different levels that you can chose for all of those inputs. And we've made a lot of those decisions and with the guidance that we've been provided we've tried to steer towards something that you know conforms a little bit more towards all the feedback we've obtained, but ultimately, we think about, okay, if I choose between these two values how will that change my result, and that's ultimately the bottom line. And so you know we can instead of say going to three representative units for each of the class level combinations maybe do some sensitivity analysis to show, okay, what really affects the end result?

I mean certainly we're open to feedback on what types of sensitivity analyses we should be conducting. You know one of the themes that Greg alluded to was staging the indoor air volume versus high initial EER level as a trade off, and so we've made an adjustment in our analysis, but there are many other -- you know we don't want to go 100 path here.

We just want to go with the two paths in that low EL range, but there may be other things such as large condenser versus -- you know large face area versus deep condenser. You know more surface area, more condenser, less power versus compressed or horsepower. And if there are such tradeoffs that we should look at on a focused bases, I think that might be a way to avoid getting bogged down entirely. And so maybe this is an issue we can come back to.

MR. DELASKI: The other thing that I would comment on is that you are going to show these profiles later on I think for the representative units and the manufacturer will have individual reactions to the numbers if they haven't already reacted.

MR. WESTPHALEN: Yes. For the 15-ton selections, we -- you know the material we provided last week we provided all those wattage profiles. And any comments on those certainly we'd consider. We haven't provided a whole lot more of that here, again, expecting we wouldn't get to that level of detail.

MR. DELASKI: But if anybody's going to have those, you get them from I guess HRI and then we can get them from Nick, right, or maybe you already have them.

MR. STARR: The presentation last week was on email to people that were on the hall, so make sure you have your presentation.

MR. DELASKI: Yes. Okay.

MR. WESTPHALEN: Okay, so do we think we can move on from the first row here? The next item here, low indoor fan power, in the NOPR phase some of the analyses had estimates of the wattage input for the indoor fan that was lower than some people thought was realistic.

And again, using the approach mentioned above of using the information for real units where we can obtain product literature and look at the indoor fan horsepower tables to get an estimate of what the fan power should be for that unit and then using assumptions for the motors, i.e., That they're consistent with EPAC requiremtns and also with some analytical tools that were developed as part of the fathom pump rulemakings to represent what the efficiency level of the motor is when it's operated at lower than nameplate horsepower.

We've used the product literature and these other inputs in order to develop the indoor fan power estimates. And for the 15-ton units, I think this was an issue in the NOPR phase more for the 7 . For the 15-ton you know for the most part they're a little bit higher than what we had in the NOPR phase at the highest levels. I think we'll show more change in the 7 where I think there are greater issues, according to the comments.

So, from our perspective I think we have what we need for this time. So again, it's open for discussion as to whether anybody disagrees with this thought.

(No response.)

MR. WESTPHALEN: Well, then moving on to low condenser fan power, again, this was a similar issue. And again, we're addressing it in a very similar fashion, using the fan power input based on product literature, information that we have about the heat exchanger, face area, the air flows on the condenser side typical fan and motor efficiencies in order to estimate the condenser fan power. And we have more information on this later in the presentation just a repeat from the presentation that was provided last week.

I don't know if anybody has any more on this side, but from our perspective we had enough to move forward on the analysis.

So, moving on to the fourth item on this chart, the single circuit versus dual circuit, meaning one compressor versus two, stages of capacity for the 7 -ton baseline in EL1. Our suggested revision to this is to consider the dual circuit at the baseline and this was one of the issues that was discussed last week that wasn't quite resolved. So, this is something that I don't know if we can resolve it right here and now before I move onto the next item.

MR. DELASKI: I think what you heard in the call week, and I think you acknowledge it already was that there is some portion of units that have the single circuit, right, that's what we heard? And the question is does this simplification of a model dual circuit is that acceptable simplification or does that take us off base on that?

MR. WHITWELL: Yes, especially when you consider that this capacity class covers product up to 135,000 BTU per hour, so I think the dual circuit is probably more representative of the capacity class than the single circuit.

MR. FERNSTROM: So, this is Gary for the California IOUs.

I think we need to know the production volume or market share in order to answer this question.

MR. DELASKI: Well, then the other question is do you or do you simply not do some sort of -- do them both, right, and then weight them appropriately.

MR. FERNSTROM: Exactly. But to simply ignore the single stage I don't think is appropriate unless we have good information that indicates that is appropriate.

MR. STARR: So, let's start there. You did the catalog selection. I've forgot how many of them you did. In that it would indicate whether it's single or two-stage compressors, right? You could look based upon all availability, so that would be one way to know it. And then you wouldn't necessarily know the sales data, but you would be a little further along. Do you have an idea of what that mix is?

MR. WESTPHALEN: Yes. My expectation is that if you look at 7 -- you know from what we saw the low efficiency units in the 7 -ton range on the model basis maybe half and half. But then when you look at 10-ton, which is an important part of the small class, you know they're all two compressors.

MR. STARR: So, another thing you could do is by knowing what the -- AHRs can provide the sales data by the whole product class so you don't know which models sold -- in other words, you could like the IER and the single-stage and two-stage, and then if you knew how much models sold that model class then you could come up with a number. Kind of like what Gary was saying, a sales weighted base volume, a single-stage compressors. But it sounds like they're not collecting that data; is that right?

MS. HOOTMAN: Well, we're doing it by product classes, so it's the entire product class, right, Nick?

MR. MILSLAK: Yes. So, it's just by product class you know whether it's constant air volume or VAV.

MR. STARR: But obviously you could look at the data before you anomolized it and know that mix, couldn't you?

MR. MILSLAK: As far as whether it's

single?

MS. HOOTMAN: I'm not dividing it until then.

MR. MILSLAK: I mean it may not be enough that we could report it anyways, depending on what the volume is.

MR. STARR: Well, within the absence of data, normally, what I think DOE would do is just do it based upon the number of models. That's how you do your weighing typically. I mean I don't know what else you would do if you didn't have information.

MR. FERNSTROM: This is Gary again.

The point being I don't think it's reasonable to just make this decision without the information to back up that course of action.

MR. WHITWELL: So, based on what Navigant -- Bob Whitwell from Carrier.

Based upon what Navigant showed last week, for the 7 -ton in the baseline IEER bucket it shows about 50/50 split between single circuit and dual circuit. Everything above the baseline IER bucket is two circuits. At the 10-ton, everything is two-circuit. So, as you go from 7 to you know up through 10-ton it's migrating from something around a 50/50 split to 100 percent two circuit.

So, if you're going to have a single model for that capacity class, you could make an argument that the two-circuit would be more representative of the capacity class.

MR. DELASKI: So, let me ask the question then, so why do we have to have the single model?

MR. WESTPHALEN: We could do multiple models. I mean in going back to how will this affect the analysis, you know thinking on a qualitative bases -- we haven't done the math yet -- if you put a single compressor unit at the baseline, then going to higher levels there will be more of an incremental cost, but there will also be more savings. And how that will balance out in terms of cost effectiveness, well, we haven't done the analysis yet because we haven't done it both ways.

MR. DELASKI: But it seems to me that if we -- again, if we have half the units being sold with a single circuit to not characterize them just strikes me as being a problem to sort of leave them out.

MR. WESTPHALEN: Half the models at the lower --

MR. DELASKI: 7 tons I get that that's not the whole class. I understand that problem.

MR. FERNSTROM: And this is Gary.

You can speculate that they're going to be more of the smaller models sold than the larger ones because generally as you get smaller you have larger volume relative to smaller volume and larger equipment.

MR. STARR: The other thing to think about here is that you know on the lower EL levels that's the cheaper model of equipment and people are already buying that equipment. They'll probably go with the least -- in other words, they'll get the IER level that's lowest, which means most likely the representative class is probably the single stage because you're price sensitive, so you're going to buy the cheapest thing you can that you can put on the roof.

And maybe at the higher IER levels there might start to be more selection that the representative class would be in the middle of then of IER levels where as lower levels of efficiency it seems like people are going to buy the cheapest they can, which means that it really should be the single stage of compression, but what do you think about that? Do you think that in your -- since you've looked at these 700 models or whatever, what is your take on that? Do you have one?

MR. WESTPHALEN: Whether we should select a single compressor as a baseline versus two? If I had to chose the one or the other?

RM. STARR: Yes, kind of based on what I was just saying, do you sort of buy into that or not really? You're not sure.

MR. WESTPHALEN: Well, I mean I would want to see the shipment data. You know another thing that plays into this is when we consider economizing and trying to model an integrated economizer with a single compressor that just doesn't work.   And so, one might ask, okay, are these single compressor units mostly southern units? Maybe they are. It's more where you use economizers probably.

MS. HOOTMAN: Speaking for my company, I would say that they're very diverse actually. I don't think that there's a regionalization to them, and I'm just speaking for my company. Jill Hootman, Trane.

MR. DELASKI: And Jill or anyone else, who may want to comment on Louis' point, or argument or hypothesis was that this is a low cost entry.

MS. HOOTMAN: And that's really the driver.

MR. DELASKI: So, this is a low cost entry, so that will affect the buyer who's buying on cost only. It could be anywhere in the country really.

MS. HOOTMAN: That's right. And that really is the driver.

MR. DELASKI: Right, so they're dispersed, and they're a significant market share.

MS. HOOTMAN: Yes.

MR. DELASKI: That 7 tons, but not at

10. So, it strikes me that they need to be modeled and you can't just throw this out as a baseline. I mean you could do unless the sensitivity shows it doesn't matter. So, I don't know -- I can't sit here today and say they don't matter based on what I know.

MR. WESTPHALEN: As I said before, I expect the savings would be greater going from a single compressor baseline, but the cost would be greater, the cost effectiveness you know DBD.

MR. STARR: So, actually, I mean I guess I would certainly be okay with saying a single compressor would be the baseline because that's where they're manufactured. I kind of feel like -- it sounds like they're agreeing with that. I'm not sure if they are or not, but if they are then it makes it easier to just assume the baseline is a single stage compressor.

MR. DELASKI: And my supposition would be that the cost effectiveness is probably pretty advantageous, because that's what they do, right? That's the first thing a -- maybe it's not the first thing, but it's -- I'm saying if there's single-stage compressors at 7 , but at 10 you know it seems like that's one of the first things people are doing with those two stages.

MS. HOOTMAN: That has a lot to do with the fact that the codes are now -- you know you just have another model at that is certain to be diminishing return, so you know five years ago or seven years ago we did have 10 tons that were single compressor.

MR. DELASKI: The fact that the market is trending in that direction it suggest to me cost effectiveness.

MS. HOOTMAN: No, I think we were more forced there by codes. We were forced there by the circuit codes, the two-speed fan codes.

MR. DELASKI: Okay, well, I guess we don't know until we do the analysis.

MR. WESTPHALEN: Well, I was going to suggest perhaps a bit of comfort with a two-stage.

MS. HOOTMAN: No question, but you know when you're a first-class sensitive comfort doesn't always come into play.

MR. FERNSTROM: This is Gary.

It's interesting to me to observe this discussion between whether it was cost effective or if we were forced there by code because in my mind presumably the code is cost effective, so those two ways of thinking about it ought to be synonymous.

MR. AMRANE: Karim with HOI.

I guess my question to the manufacturers is can we collect this information or not, given the timeframe given to us to collect this information, or would it be too difficult to collect it?

MS. HOOTMAN: I'm just speaking for my company. That is not that hard to get. The IER was the hardest stuff to get, but that's not that hard.

MR. SACHS: Harvey Sachs, ACEEE.

A long time ago, Jim Wolf of Trane said that something about the baseline is the least efficient thing I can sell and stay out of jail and that was for a single-stage, 7 ton and perhaps a two-stage by the time you get to 10 ton.

MR. WESTPHALEN: So, I guess moving forward on this and thinking about the options might be, one might be analyze both, but I think that's what I'm hearing in any case, but then how do weight them, whether that be based on shipment data or a number of models.

MR. SACHS: This is Harvey.

And it seems to me that once you've done that analysis that's arithmetic portioning, based on the quality of information you get from the manufacturers and so they can provide that. If we can get shipment weighing cool. If we can't, we have a little bit of sensitivity question for model numbers. But I think the important thing is to make the decision that we should be looking at a single-stage in the 7 ton and a two stage in the 10 ton.

MR. WESTPHALEN: I think in any case, at least on Navigant's part that's clear enough marching orders to move forward with additional.

MR. STARR: So, the only thing I would say is that if -- I could see a driver would need to collect -- but if they don't collect a mixture of it, it seems like it wouldn't be worth you're just spending time -- it's not necessary to spend time on it. So, before I did that I would make sure if they were to collect data or not and figure out what that mix is; otherwise, it seems like we'll just assume that a single-stage compressor.

MR. DELASKI: But I think you heard at least one manufacturer say it wasn't that hard.

MR. WESTPHALEN: However, by the time we get the data, we have to have the answer already.

MR. CYMBALSKY: John from DOE.

I just want to make it clear because maybe it wasn't clear in my mind even that the NOPR analysis had the single-stage unit as the baseline.

MR. WESTPHALEN: We're doing a little different or more work now than we did then.

Okay, I don't know who's taking notes, but you know from my perspective this means we'll be working through the engineering for both one and two compressor at baseline 7 and then should we consider whether we would carry that through to EL1 or I don't know those that have looked at the data for the last week whether that's compelling enough at

EL1.

MR. CYMBALSKY: And is it possible to go in with the revision of a 50/50 split until we get data that says something different? Is that okay with people? I'm just throwing it out there.

MS. HOOTMAN: I'm okay with that.

MR. WESTPHALEN: Yes. I mean changing the number downstream is easier than coming up with the two different numbers.

MR. CYMBALSKY: Right.

MR. WESTPHALEN: EL1, 7 -ton units are available with a single compressor as well, but you know there the split is leaning a little bit more towards the two compressor.

MR. SACHS: This is a factual question, and the answer may differ with a manufacturers. When I go to a two-stage in these smaller units, is that typically done with two compressors or a two-stage/modulating compressor, likely the 7 ton to go with a two and a half and a five, so I get three stages, or is likely to be done as a two-stage machine that gives me -- a single compressor that gives me two values?

MS. HOOTMAN: Jill from Trane.

If we're talking about the low-cost, single compressor it doesn't have any modulation because that is expensive.

MR. SACHS: Jill, I'm sorry. Thank you for trying to bail me out, but once I made the decision to go two stage, is that more likely to be with using two constant speed compressors or a single modulating compressor?

MS. HOOTMAN: I don't know that we could characterize it because everyone has different design choices for different reasons.

MR. SACHS: Thank you.

MR. WESTPHALEN: Well, I guess regarding the EL1 I don't know if there's any input. I think if we can find and had the time do to it both ways at EL1 we'll consider that.

Okay, so maybe moving on to the next issue, the last one on this page here, that is staged air flow for lower efficiency levels. So, in the NOPR analysis the concept of reducing the indoor air flow part load was not introduced until EL2 or 3. It might've been EL3 and so as a revision here what we're considering is the dual path of the lower ELs, in particular, for EL1 and EL2 introducing staged indoor air flow and considering that cost efficiency path and what it means to the energy use analysis in buildings, and then also considering constant air blowing path.

And there are several considerations here as well. Some have to do with the existing buildings for which you are replacing the unit, which might have been constant air volume where the existing ductwork would have been constant air volume ductwork. And so this is where we get into potentially considering costs for upgraded air distributions in lower stage air flow less than 60 percent of full air flow where the existing diffusers wouldn't operate properly. You wouldn't get good air mix and it would be very cold underneath the diffuser, but not cool enough far away.

So, this is where we said from our perspective we received enough feedback from the group that we think we could go forward with the analysis, but we can revisit this in the discussion here today.

MS. WALTNER: What sort of data do you have on existing distribution systems, like the percentage that are considered.

MR. ROSENQUIST: In our last phone call, I think that we looked at the CBAKS 2003 and around the 70 percent/30 percent split, or a 70 percent constant air volume and 30 percent are variable.

MS. HOOTMAN: And Greg, that's at what, up to the 135,000 and that's it?

MR. ROSENQUIST: There's no designation on capacity.

MS. HOOTMAN: No designation.

MR. ROSENQUIST: Right.

MS. HOOTMAN: Okay.

MR. ROSENQUIST: So, without anything else we would use those fractions.

MS. HOOTMAN: There's no designation by like square footage or anything like that?

MR. ROSENQUIST: There is that, yeah, a

big building.

MS. HOOTMAN: So, the bigger the building would it designate then if it was a 70/30 split or not?

MR. ROSENQUIST: We could desire down to that level, so I don't know those numbers by the size of the building, but we can certainly do it that way.

MS. HOOTMAN: So, I mean if we were to agree that -- and I don't know if we are. I'm just saying if we were to say that everything for the product class up through 135,000 is square footage of -- and I'm just filling in the blank -- you know whatever, 20,000 square foot. And then we said the next one is 20,000 square foot to whatever you know you could characterize it by that?

MR. ROSENQUIST: Yes.

MS. HOOTMAN: Okay.

MR. FERNSTROM: So, this is Gary.

The outcome of that would probably that we'd find smaller capacity equipment is much more likely to have constant air volume than larger buildings and larger capacity.

MR. ROSENQUIST: Yes, I think that's what the group -- the formal working group has sort of concluded because I think it's on the table right now what to do about 30-ton equipment, right? And there was one point made that perhaps that one should be considered to be variable air volume or staged air volume at the very minimum. So, anyway that discussion is for a later time.

MR. FERNSTROM: So, probably in new construction that's true, but for existing buildings it may not be so much.

MS. HOOTMAN: So true. And at 30 tons I would ^^^^ but during this 35 years I was product manager for many of those years and I will tell you that a good portion of them are variable air volume. They have been since the 1980s, so they're there. They're all variable air volume. They used different control methods, but they're variable air volume.

MS. WALTNER: Jill, am I correct in remembering that that's one of the things you were collecting data onto what percentage?

MS. HOOTMAN: Yes.

MS. WALTNER: Okay.

MR. ROSENQUIST: The answer to that would be borne out in that data, at least on current shipments.

MR. CYMBALSKY: Can't a big building just use a lot of smaller units? Is that common practice from my not a lot of knowledge, but just looking on a rooftop it seems to me that you can employ lots of small, constant volume units to a larger building. The only reason I bring it up is because I want to caution that mapping that you're describing could be that.

MS. HOOTMAN: I agree, John, that would have some works to it. And you're right, at larger buildings, depending on its use, could be all constant volume or it could be BAB. If you classified it as an office, it's BAB. If it's a large box retailer at that same large then they're constant volume, and it's the nature of what's happening in the building. I agree. It has works. I didn't know what his data had. That's what I just asking him.

MR. CYMBALSKY: I'd feel more comfortable with the building type defining the volume.

MR. SACHS: This is Harvey.

And a follow-up question for Jill. My memory is that the CBAKS data also breaks down by number of floors. And by the time you get into the 30 ton are you penetrating more than two floors or so for your BAB systems.

MS. HOOTMAN: It still could be two floors and still could be a single floor. I mean I could think about around Nashville where I'm from you know there's a lot of single-story, big square footers because land's cheap.

MR. SACHS: I understand that. I'm really asking the converse. Am I seeing 40-ton units on six-story buildings carrying the air all the way down from the roof? That's important to me. Thank you.

MR. STARR: Well, I would say something about that. Normally, the cheapest thing to do is what you would do, which is you get the biggest amount of equipment to cover the most you can in the building. So, you have the option of two 60 tons for an office building -- three-story office building you would try to go with one large unit and drop one -- the more drops you have in the building the more floor space you take up and so you generally try to keep everything in one spot and run as much -- the biggest equipment you can with the centralized ductworks.

MS. HOOTMAN: If it's all single owner.

MR. STARR: Yes.

MS. HOOTMAN: Yes, building ownership is not always single ownership, metering and all that has to do with it.

MR. STARR: So, I had another question about the 60 percent if we were moving onto that, that 60 percent of full load I have a question in general about. Are you saying when you have a system that can deliver below 60 percent air flow then you are considering the cost of upgrading the system? Is that essentially what you're doing in that for your analysis?

MR. WESTPHALEN: Yes, there would be cost of upgrading the particular diffusers if it's a small capacity.

MR. STARR: So, right now the way the two-stage equipment works is that it's at -- well, I should say I think this is how it works is that 100 percent where it turns down to 66 percent of air flow. So, in that case on the two-stage equipment you would not be considering the upgrading of your distribution system; is that right?

MR. WESTPHALEN: Well, I was a little bit surprised when I heard the comment last week that at two-thirds you're fine with any existing traditional CAV diffusers, but that's potentially something up for discussion.

MR. STARR: I actually had that. Where that comes from is the 9.1. It requires that you have for staged equipment you have two stages. My understanding was that it's more for ventilation. So, when you're heating or cooling, you're basically a hundred percent. And then when you're ventilating, you switch to your 66 percent load. But what I don't know is do they have staging, such that if you switch down to your 66 percent because then that would seem like more of a problem.

In other words, if you were ventilating a space maybe the air distribution isn't so critical, but if you're running a light load and running your AC all day at 66 percent on a moderate day then that's where kind of what Detlef was saying would be surprising. And so I don't know enough about the equipment to know if you're going to run at a lower stage at a lower CFM or would you run your cooling always at the higher CFM no matter what.

MR. WHITWELL: We run the lower stage at the lower air flow.

MR. STARR: Okay. Is the 66/100 percent the right split on that, or does it depend upon the characteristics?

MR. WHITWELL: Well, the 66 percent comes from ASRAC 90.1 where it says you must have two stages of air flow and the lower stage must be at 66 percent.

MR. STARR: Is that essentially just really constant air volume application and so now they've put some more requirements in there, say fan energy? So, it's really just a constant air volume distribution system essentially; is that what it's being hooked up to? I mean you're not hooking up the VAV boxes, right?

MR. WHITWELL: That's correct.

MS. HOOTMAN: That's why it's called single-zone VAV. It's varying the air volume, but still a zone is all ductwork and all that is considered single zone.

MR. WESTPHALEN: So, I think one of things we potentially have here for input is guidelines that the LBNL team can use if the recommendation is that they do this to apportion the different capacities to the different building sizes and the CVAC survey in order to allow proper estimate of accommodating these buildings at different capacity levels are VAV or CAV.

MR. STARR: Are you talking about the three levels? What percentage of constant volume of VAV or are you trying to get the split on that?

MR. WESTPHALEN: Well, Greg mentioned that CVAC has the percentages of the floor space that is CAV versus VAV. And so, Jill had the question of, okay, well that would vary by the size of the building or it would vary by the type of the building.

And so, there's the question of instead of straight up using a commercial building percent of CVA to do a little bit more of the disaggregated query into CVAC you know to do a two-dimensional/three-dimensional assessment to figure out what percentages really are CVA.

MR. ROSENQUIST: You know Katie just looked at the CVAC data and the 2003 CVAC data and at least by building count smaller buildings have a much lower percentage of VAV than larger buildings, and it sort of graduates up. It's more like a bit of a hockey stick.

MS. HOOTMAN: Yes, we would agree by equipment shipments.

MR. ROSENQUIST: So, with that then, I mean --

MS. HOOTMAN: That's what I'm saying. With that then do we say that the small class is constant volume, the 15 ton we probably have a discussion about, and the 30 is probably all VAV. You know I don't know. I mean that's why I'm saying I don't know that we can flatly say 70/30 across all of it.

MR. ROSENQUIST: Right. Like say for 15 ton we have two design paths, right, for 15 ton at EL1 and EL2, and the 7 ton will be the same thing. So, I mean we could allocate a market share of zero percent for 7 ton or 10 percent or some small fraction, whatever. Again, what this working group decided.

MR. WESTPHALEN: Yes. And AHRI is collecting data on this, so that'll help us to decide what percentage we should allocate of the different capacity classes because even at 7 in that capacity it won't be zero. It's not a zero.

MR. CYMBALSKY: This is John from DOE.

So, what I'm hearing is we're going to vary these percentages once we get the data from AHRI; is that what the group is -- okay. That sounds good to me too.

MR. WESTPHALEN: Yes, it almost sounds to me like LBNL would do a first cut and then it might be adjusted based upon their result.

MR. ROSENQUIST: Right. Because we're planning to do these different design paths, right, based upon the type of air volume system it was. And we're going use 30/70, right, but now we'll use some refinements to that. And we won't zero out the VAV 7 tons, but we could, based upon what we're seeing here and again just report back when show our results.

MR. CYMBALSKY: Okay, I'm going to jump in and declare it's lunchtime. We'll come back in one hour and 19 minutes.

(Whereupon, a lunch break was taken at 12:26 p.m.)

MR. BANTLE: Okay, good afternoon everyone. We will bring it back together. I hope everyone had a good lunch.

Just a brief comment from the Legal Department, and then we'll head back to Navigant.

MR. STAS: Eric Stas, DOE.

So, especially for Andrew, I took your

questions back and started the process to get some answer percolating. I'm not going to have those answers today, but we'll try to get them to the group as soon as possible. I've urged by the next meeting, but it's kind of a little bit out of my hands; but as soon as we can get it to you we will get it to you.

MR. WESTPHALEN: All right, so I think we finished with slide here, so I'm moving on to the next set of issues.

(Slide.)

MR. WESTPHALEN: So, the one at the top here pointing out that the baseline unit -- some of the baseline units selected for the analysis at had EER lower than the current standards. In the revision, essentially, we're basing the analysis on existing models which meet the standards; otherwise, they wouldn't be for sale.

I don't know if we want to go back to that question of the EER. I mean I think there are many issues associated with EER, but if there's no comment I'll move on.

(No response.)

MR. WESTPHALEN: One thing brought up was the potential need for conversion curves. If the standard mandates efficiency levels that push package sizes larger than the existing package size for replacement units and so the team is considering incorporating this into the analysis.

There was some discussion last week about potentially some of the manufacturers, maybe through surveys or measurements, providing some input on potential pressure drops and cost parameters associated with conversion codes, and so that's why we have the additional input required here. I don't know if anybody has any comments or information at this point on that.

MR. STARR: This is Louis Starr with NEEA.

I think one of the things from -- I guess in my mind the phone call the concern I have is on the conversion. So, it's basically additional pressure drop due to the conversion curve. And the thought is the bigger the unit the case sizing gets larger and now all of a sudden you have to have in order to fit on the same curve you need a curve adapter to fit on there, which is possible for the higher -- basically higher EL3 and 4s is ones that it's going to apply to. Is that, more or less, the issue that we're talking about?

MR. WESTPHALEN: Yes, that's the issue.

MR. STARR: Okay. So, the thing I had about that in addition was really there -- you know I would probably be okay with that. It's just the magnitude of the pressure drop relative to the amount of pressure drop that's being used in the air handler. And you know I have a proposal is that you know the typical -- I looked through the PNL models, the 90.1 models, and I also looked through the commercial DOE prototypes. And basically, they used in small office, which is generally the small air handlers that would probably be appropriate for our size is they're using about 2 static inches of pressure for the fan. And a conversion curve --

MS. HOOTMAN: Total?

MS. STARR: Yes, total. It's a lot as opposed to the HR test procedures .3 something. And so, what I would think might be a good idea was that it makes sense to add a pressure drop of something, but I think percentage-wise -- in other words, let's say there's 2 inches of pressure and you figure the conversion curve is .2. So, that's basically an additional 10 percent pressure drop that you have to overcome for having a conversion curve.

So, what I was thinking is like let's take whatever the -- the thing that you're writing, the equipment at .3 pressures and just add 10 percent more on for a curve adapter and run that using the number of your static pressure for those higher EL levels. Do you get more or less what I'm talking about or the concept?

MR. WESTPHALEN: I understand what you're talking about.

MR. STARR: But do you see a problem with that? I mean -- well, first of all, I guess I should say do you see an issue if we attribute like .5 inches for the higher EL levels as opposed to .3 inches it's just that it's going to really show a lot of fan energy in the higher static or in the higher efficiency levels, and that doesn't seem quite fair.

That's what I'm trying to get at with this suggestion.

MR. WESTPHALEN: Well, maybe the conversion curve would loss more for a larger capacity. Until somebody has some data, we don't know.

MS. WALTNER: And I think the underlying issue is that we're not using realistic static pressures for the system in the rest of the analysis, so then when you look at the static pressure we're using there compared to the side pressure added by the conversion curve the relationship is off because we're not using the right or real-world static in the system. So, that's going to sort of bias the results against higher efficiency levels.

MR. WESTPHALEN: No, I understand that. But in order to get the right impact of the additional pressure drop, you really want the actual pressure drop, not a percentage of the other external static pressure. And I see these two issues as -- you know they're related, but they're separate decisions to make on these two issues.

MR. DOPPEL: Paul Doppel.

I think it should be noted that the external static pressures that are used in the testing are set up for a certain building parameters and that's so that there could be equitable, comparable testing from one system to another. And so there's going to be whole variances of what a system could see once installed, but they are realistic for the testing parameters that have been set up.

MR. FERNSTROM: So, this is Gary for the California IOUs.

I understand the value of having an even playing field such that the test allows different units to be compared to each other, but it's really important for us, the California Utilities, to try and have these tests results be as realistic and representative of field conditions as possible. And oftentimes, tests are simplified in such a way to allow comparison between equipment all right, but not necessarily be very representative of field performance.

So, it would be great if we could move in the direction of utilizing numbers in our analysis that are as representative of field conditions as possible.

MR. STARR: So, you know I was just thinking -- so I actually asked some engineers because the conversion curves are kind of unusual to apply because it's usually only a retrofit that you're going to do this on. And the numbers they gave was a 1/10 of an inch to 2/10 of an inch. Actually, they threw in some other things like systems affect, which you're not talking about, but if you think about whether it's a 1/10 or 1/10 of an inch when you only apply it to a fan static pressure point or two -- if you do it on a percentage basis, it doesn't really matter whether it's a 1/10 or 2/10 the additional amount is going to have little affect on it.

So, I mean I personally would be okay whether it's -- you know you use 1.5 or .2 it's probably okay. It's more the treatment of that next step. So, to my mind the pressure drop of the conversion curve is not so much the issue, but it's how you apply it to the next step that you're going to do that I really have an issue with.

I mean, in other words, what if it's .17 -- I don't think it's going to make a difference if it's .2, .17 or .15. if you're just adding on that a small percentage on the .3 static of that as opposed to .2 onto that. That's where the big difference is.

MR. WESTPHALEN: So, when you're referring to the next step, you mean you know the general ESP?

MR. STARR: Exactly.

MR. WESTPHALEN: And that's one of the parking lot issue that we have you know like a separate topic for discussion.

MR. STARR: Okay.

MS. WALTNER: You know another question on conversion curves maybe going back to the cost side of things. So, my understanding from the conversation last week was that some units use them. Some units don't. You know what's the potential for units to be redesigned so they don't need conversion curves because that might be more cost competitive?

Have we thought about that? And do manufacturers have thoughts on how necessary conversion curves are at higher levels and whether that will remain the case you know if we move the standard to those higher levels?

MR. WESTPHALEN: I don't doubt that the manufacturers in this room have engineering at their disposal that's very creative and might be able to you know come up with higher efficiency levels at some point that fit the existing curves, but at this point we're kind of heading down the path of basing the analysis on existing units where we can point to the sizes. And so that would be the basis of at what point would a replacement unit have to either have a larger curve built into the roof, which is probably less cost effective, or put a conversion curve on there in order to install it.

MR. DOPPEL: This is Paul Doppel.

So, what's your intent for how to handle this in the current analysis then? So, how are you going to determine whether your conversion curve is needed or not?

MR. WESTPHALEN: Well, we were thinking that EL3 would be an appropriate place to say that, okay, at that level or higher we'd need a conversion curve.

MR. DOPPEL: And did you find that the units that you looked at today all required a conversion curve at EL3, or have you looked?

MR. WESTPHALEN: We looked at the size progression for the key capacities we were looking at for different manufacturers. And some bump up in size --

MR. DOPPEL: I'm sorry. You're talking pretty quietly.

MR. WESTPHALEN: Some bump up in size at lower levels in EL3, some at EL3. I mean I don't have all the data in my head.

MS. WALTNER: And I don't know that that's necessarily fair to characterize it on what it is today. Those designs at EL3 and EL4 today are not designed to be the minimum efficiency. We will look at it differently.

MR. DOPPEL: Right.

MS. WALTNER: They are high premium. You know not optimized necessarily in cabinets like we would look like in the future.

MR. DOPPEL: Right.

MS. WALTNER: So, I don't know that that's a fair characterization to say that you know here's the break today and that break will happen tomorrow. But all of us no matter what we do, no matter how fantastic engineering we have, we will have break points. It will require conversion curves, and the market is over 60 percent replacement.

MR. STARR: So, one last thing, so on that you're assuming on EL3 it's only on the percentage of the market that needs -- on new construction you don't need conversion curve, right, to put it on?

So, when you look at the EL3, it's only the percentage of EL3 that's going into existing. So, where that's 60 percent or 80 percent or whatever that is, the number, so it doesn't get applied across the whole category, is that right, or are you splitting it up into two segments. One that EL3 it's conversion curve and EL3 it doesn't get a conversion curve in your analysis?

MR. WESTPHALEN: The intent would be when considering an EL3 as a standard level. If the consensus is that's the right level to require a conversion curve, then you would look at the replacements that aren't already at that level and say those would require a conversion curve.

MR. ROSENQUIST: The other thing I wanted to add regarding the static pressure -- I mean so this is a section that I'll be addressing, but jumping ahead we're planning on having Detlef and the Navigant engineering team provide us with fan powers at higher static pressures for the same rated powers. And the input we would need from the working group is at what static pressure should we use to do that.

MR. STARR: That's easy. Just use the 90.1 models and that'll get you the 2.5 static inches that I was talking about. I looked a couple different types of warehouses and small office and came up with those numbers. And it has a static pressure as to the inputs into the model.

MR. ROSENQUIST: Yes, we were just looking at the blast data, and apparently they model .75 and 1.25 external static pressures in that analysis so I don't know what the basis of that is.

MR. WESTPHALEN: What were those values again?

MR. ROSENQUIST: .75 and 1.25.

MR. SACHS: This is Harvey.

I really need to ask for an explanation to overcome of my naivety. When I think about the general issue of the conversion curves or any curve, I see at least three parameters. One of them is the cross-sectional area of the supply and return ducts. The second is the positioning of the supply and return ducts. And the third is the total area batch of the curve. Now, which of these are the critical parameters as we move up in EL?

I understand the heat exchangers are getting bigger. Does this mean that my duct sections are also getting bigger? Does this mean I'm moving things around within the cabinet to re-optimize that spacing, and therefore I've got to have an adjustment to move the supply and return ducts? What exactly is the engineering issue that the conversion curve is addressing?

MR. WESTPHALEN: Well, it's addressing -- you know supporting the weight of the unit. And as you point out, having the openings for the return and supply ducts in the right in places. You know in some cases you could envision the unit hanging over the existing curve.

I mean we're open to input on -- you know is EL3 not the right level at which to consider this? Should there be a more sophisticated assessment for each given situation, given the existing models that we're talking about? I mean we're open to discussion on this.

MR. SACHS: Please let me try once more. And maybe I should be addressing this to Bob and Jill and the other OEMs, that as I move up -- you too Rusty. In EL4, am I likely to be moving my condenser and evaporator -- well, my supply and return ducts further away from each other so I now have to have some curve in my adapters? And that means I've got to have some vertical spaces.

MS. HOOTMAN: Yes.

MR. SACHS: That's where I'm trying to get a figure on.

MS. HOOTMAN: The openings might get bigger. They might change in space.

MR. WHITWELL: That's what the conversion curves would refer to what numbers.

MR. SACHS: So, is this something that is changing what I'll call footprint as well as size? Footprint being the relative position of the two ducts and their size, is that something that starts happening at EL1? Does that start happening at 3? Does that vary enormously, depending on capacity and manufacturer choices or where are we on that?

MS. HOOTMAN: It definitely happens at three. It's my opinion it definitely happens at three. Jill Hootman from Trane. Sorry.

MR. WHITWELL: Yes, I agree. Bob Whitwell from Carrier.

MR. SACHS: Thank you. This is Harvey. And that helps me a great deal. Would I be thinking in terms of the vertical riser to accommodate that offset that looks like it's 12 inches, 24 inches, 6 inches on a 15-ton unit? Is this thing going to be up on stilts?

MR. HOOTMAN: On a 15 ton, it could elevate it three to four feet, yes.

MR. SACHS: Thank you. That's very helpful.

MS. HOOTMAN: So, accommodations also have to happen on the roof for stairways, for access for servicemen in order to get to these units now because they are that high up. It definitely happens on 30 tons.

MR. DELASKI: This is Andrew.

I just want to follow up on Jill's earlier point, which is that a manufacturer when a new standard goes into effect are going to redesign to meet that new standard in their volume product, right? So, what we see today -- you're doing a model based on what you see today, recognizing that what you see today is not what you're going to see in the market comply with the new standard. And so that's sort of a basic, underlying tension in this analysis, the way it's structured and we can't make that go away. You know these are some decisions being made already earlier today.

What I would submit to the group is that there's a built-in conservatism in the analysis because of this, right? So, you're building in a cost that, as someone said earlier smart engineers may very well find a way to develop because you're going to have a cost advantage. If you can make that product without a conversion curve and your volume unit for that portion of the market during the sales you're going to have a big advantage in the marketplace, right, come three years from the final rule date.

And your competitors are going to have to do the same thing or else they're going to lose market share, right? So, it's going to be tremendous pressure to find those solutions. Unfortunately, I can't sit here today and say you know at what level that's going to be, right, at what level do you not need a conversion curve?

But what I would submit to the group is

that it is a conservatism in the analysis that's going to increase costs and reduce savings at those higher levels. And that quite possibly will not obtain -- you know I don't know a way -- I can't say it's EL3, EL3.1, EL3.5. I don't know. There's no way for me to say.

MS. HOOTMAN: Jill from Trane.

And I agree, Andrew, but you also have to remember that we also opportunistically have to look at who was in the marketplace, who were we replacing? And we might be replacing someone else, so it's not just like manufacture to like manufacture. It's you know if I'm trying to grow a marketplace I'm going to try to replace over Carrier. So, I might choose different ways to attack that.

MR. DELASKI: But would that apply, the conversion curve?

MS. HOOTMAN: I'd have to do a conversion curve, likely.

MR. DELASKI: At any efficiency level?

MS. HOOTMAN: Possibly, any efficiency level, yes.

MR. DELASKI: So, that suggest in the base case we have conversion curved at a certain rate that we have to capture it.

MS. HOOTMAN: That's possible, yes.

MR. DELASKI: Right. You know if you're switching from one manufacturer to another then that's a part of the base. I mean this suggests to me -- you know I don't know how big an issue this is. I mean is this a 2 percent issue or is it a 20 percent issue? I mean if it's a 2 percent issue then --

MS. HOOTMAN: Two percent to the energy analysis or -- I don't know.

MR. DELASKI: Or do the cost analysis, right? So, is this a sensitivity and we just can dispose of this, or do we need need a sensitivity to know I guess is the question I would pose to the group? How far do we have to go down this issue or can we set it aside because it doesn't matter that much?

MR. WHITWELL: Bob Whitwell from Carrier.

From a cost perspective, it's significant, right? So, I think this other question about from an energy perspective or how often it's applied that's something I think we need to think about, but from a cost perspective it can be a significant cost at thousand bucks possibly.

MR. ROSENQUIST: Hi, this is Greg.

From a cost perspective, this lends itself very nicely to a sensitivity analysis. So, you could see this in the life cycle costs results by just either having a conversion curve or not having or just having it on certain efficiency levels or certain parts of that market.

So, on the energy side, again, that's a little bit more involved just because we have to be more careful about our calculations to get capture the energy consumption.

MS. HOOTMAN: What about cost sensitivity just from the equipment concerning sensitivity?

MR. WESTPHALEN: Well, I mean on the costs there would be -- I mean I guess here's the question. If you're going to put a unit on a conversion curve, does the unit itself have to change?

MS. HOOTMAN: Yes, possibly could need high static motors in order to overcome the static, so -- not always. Not always, but depending on what you're talking about here in this arduous path that happens in air flow if that design was already at -- you know kind of maxed for that unit or maxed for the standard motor we almost all offer high static motors. In these applications, we might have to move to a high static motor to do it.

So, I'm just thinking through like a 7 ton might be at one inch of total static and now you're using up another .2 to .25 or something in this path. That might very well move you into the high static motor, and there's a cost for that.

MR. WESTPHALEN: Right. And that's something we could to the product literature to evaluate once we decide what the ESP for the ductwork was.

MS. HOOTMAN: And for John's benefit, but that high static motor is more efficient than our standard motor.

MR. WESTPHALEN: But beyond that, then you know I mean the cost within the unit is potential upgrade of the motor and the pulley system.

MS. HOOTMAN: That's right.

MR. WESTPHALEN: You have the cost of the curve. You have the people installing have more to do, so those are the different aspects of the costs.

MR. STARR: This is Louis with NEEA.

You know, realistically, when you're -- you know if you're hooking up to an existing system, you have to guess at what the ductwork is, and a lot of times it's overestimated. Most of the static pressures when you order a new unit what the static pressure you order is probably going to be a lot more than what is actually need for the job because when you're sitting off in a design office designing these things you don't what's going to be in the field conditions a lot of times.

So, there's a tendency to oversize the equipment because you don't know if they're going to route the ductwork in a circle, in a square, and everything else before it gets to the diffuser, so you have to put a lot of safety factor in the design.

So, an extra 2/10 of an inch I wouldn't think, in general, is going to push that over the edge. And chances are it's probably going to be -- you know the other thing to think about is when you come in with newer equipment motor efficiencies and fan efficiencies have probably gone up rather than going down, so you're getting more work for the same amount of energy based upon higher efficiency products.

To me, I think sizing to a higher static motor is probably not too likely unless you're already there to start there.

MR. DOPPLE: So, Paul Dopple.

So, if you're designing for a building, you're going to have to take that into consideration. That's not like a surprise that would occur. You would know that ahead of time and that would be part of the calculation.

MR. STARR: Yes, you might if someone went through with a tab report, right? That's how you'd have to know that. If a balancer went through and told you what the static pressures are in the existing system; otherwise, you might just take the same piece of equipment and make sure that you end up with the new stuff is the same as the old stuff.

MR. DOPPEL: Not if you're talking larger capacity systems because people don't want to make a mistake, especially with all the cost of having to put the equipment on the rooftop. That's a huge adder too.

MR. STARR: Well, I mean think about it. If it's the exact same unit that's replacing your older unit, as long as you get the same -- I mean, first of all, not everything is engineered, right? The contractors as well do the work and they don't necessarily -- or maybe not going through a thorough process.

The right thing to do would be is go out and get the actual numbers of the pressure drop and the duct work or what the existing systems are operating at and then size your equipment based upon that.

MR. DOPPEL: But the conversion curve would be part of the ordering process even it was just a contractor. So, in order to get the conversion curve, they're going to have to do an analysis of what was there before, what the capability of that system was, and then they're going to have to re-look. So, it's going to have to be included; otherwise, they're going to get in serious trouble on that job, and they don't want to do that.

MR. STARR: But I mean think about. When they order the air handler, most likely, it's not running at full tilt. In other words, there's room for more capacity in that system. And if they designed the equipment at inch static pressure, likely there's going to be less in that or they wouldn't have been able to balance the job in the first place. So, in other words, it's only 1-inch static of pressure.

So, you throw in the static curve and you've got another .2, so you're at 1.2. The original system was sized to 1.5. You might even be able to downsize your system a little bit.

MS. HOOTMAN: I don't agree.

MR. STARR: Which part?

MS. HOOTMAN: I don't agree with that. I

can probably show you, and I just don't have time to pull it up here, a 7 ton that will be nominally at 1-inch static. And the minute you go to 1.2 you're going to be in an oversized motor. And we design it around the 1-inch total static and the edges are there. And I know we ship a lot of them and I've seen our customers use them on the conversion curves.

MR. STARR: So, you mean, though, their existing systems that they're hooking up to you're saying is one inch?

MS. HOOTMAN: Yes.

MR. STARR: They may be already be under performing, right? That's possible. In other words, the equipment that's already there may not be performing to what it needs to and you're trying to save money you cut the cost out of everywhere. So, most engineers' designs are the opposite, right? They're trying to cover themselves, so they're going to oversize everything.

The contractor is the other way around, right? He's trying to save money and he's figured they always oversize stuff, so I'll just undersize my stuff. So, I mean I guess it is a mixture of the market.

MS. HOOTMAN: I can tell you what I ship, and I can tell you that isn't what I ship.

MR. WESTPHALEN: Well, we could proceed on this on the engineer side by providing to LBNL the performance correlations that include a .2-inch static addition for full load air flow. And then if we can get input on costs, then we can use a cost number and then do some sensitivity analyses afterwards to see how that would affect the result.

MR. STARR: The other thing too is you should, in your model, when you drop the CFM so that you have a VFD you should also be dropping that pressure drop with it, right?

MR. WESTPHALEN: Right.

MR. STARR: Right.

MR. WESTPHALEN: That's important.

MR. DELASKI: I was just looking back to the costs. So, on the cost side of the equation you know it just strikes me as an important question where do you apply this cost adder for a conversion curve? And I don't know how you're going to determine that. I mean it's been floated here at EL3, but I think I heard you say that some manufacturers think that some today are doing that without a conversion curve already. Some are using conversion curves. Some are not.   Some would require, based on your analysis, a conversion curve. Some would not.

You know it just strikes me as a bit of a leap to say that that's the point. So, I think, at most, you want to a sensitivity with and without on the cost side and account for some proportion that needed in the base case, but that would be more for the overall analysis.

MR. WESTPHALEN: Right.

MR. ROSENQUIST: On the conversion curve, all that is on the installation cost side, right, for replacement of an existing unit. And what Detlef and Navigant need to provide are performance at the higher standard pressure, whatever that is, .2 inches above the field accepted value.

MR. WESTPHALEN: Yes. And if you do have to go to an oversized motor that can be treated as part of the installation that, okay, well in this installation you know there's more costs required coming from the factory.

MR. ROSENQUIST: Just one last thing about that, to assume an oversize motor you basically have to assume everything is right at the edge. So, what you could do is assume a certain percentage of the population is at the edge. In other words, they've got it designed right up to they need exactly one inch of static pressure and that's what the fan can deliver.

And so there will be I'm sure, as always, there'll be a certain population that has designed it right up to that amount. But it'll be a lot that you know it's a one inch thing, but it only needs three-quarter or whatever. And so if nothing else maybe getting some kind distribute, maybe not always going to an oversized motor, but maybe sometimes doing it. That could be another way to do it.

MR. WESTPHALEN: Well, do we think we have enough discussion on this topic? Again, if anybody does have input on -- and I guess here I'm looking to Greg. You know I assume that there's been some research potentially that you'd conduct on what are conversion curve costs?

MR. ROSENQUIST: Right, there'd be the conversion curve. You know we can get an estimation on the conversion curve. I mean certainly welcome input in the group for that, but barring that we'll estimate it. If you're talking about potentially shipping out a larger motor, I mean along with the power at the higher pressure drops that would also come from Detlef and the Navigant team along with the power at the higher pressure drops. That would also have to come from Detlef and the Navigant team.

MR. STARR: And one just last thing. You mentioned the glass model has I think one and a quarter and three-quarters for the different sizes. So, keep in mind with the -- test procedures actually covering not only just the external side, but it also has the fan that they use has to overcome the coil losses inside the unit and things.

So, that's why in the model they look at the external static pressure consistencies, but the fan actually sees -- most of time because there's only one fan it sees the return ductwork. It sees the filters. It sees the coil and whatever else, so when I looked in the PNL model and also in the commercial one, it's kind of figuring those pieces in there too. So, I think it's 622 pascals, which comes out like 2.5 or something.

Anyway, I just looked up those models and it's right in the input file for the different prototypes they have. I mean I didn't do a thorough analysis, but it's in there. I would say you know that I think, in general, it seems like everybody's been happy with the PNL models on that front, but if not, that'd be okay too.

MR. WESTPHALEN: Okay, maybe we ought to move onto some of the other topics here. One issue raised out the NOPR comments was the fact that the coil designer and ^^^^ well, just the coil designer software that we're using for much of our analyses only did smooth tube coil analysis back in 2013. We were not using the updated coil designer, which has a rightful tube and so that should be resolving that issue.

MR. THARP: Rusty Tharp from Goodman.

One thing we do need to be careful of is the simulations need to be calibrated to the test data to make sure that inputs are correct because very minor differences in the inputs on the internal enhancement can make a very significant difference in the estimated simulation results.

MR. WESTPHALEN: Good point. And basically, what we're doing is we're matching to a known parameter, such as capacity of EER. And so, to the extent that we have that information in the published literate, we're matching those key parameters.

MR. THARP: So, to me as an engineer, the key parameters are refrigerate state points, not results. So, if I've got a 300,000 BTU unit, I can get the 300,000 BTU's multiple ways in the simulation results, but the refrigerant state points can vary wildly. So, what we should be doing is matching the refrigerant state points.

MR. WESTPHALEN: Which we can do if everybody gives up all their test data.

MR. WINNINGHAM: This is Dave with Allied.

I would agree with Rusty. And we've kind of talked. I mean one of the methods you've used to match the capacity and efficiency was just change air flow, and I think that's brought us into some problem areas. And I think the refrigerant state points is more of what you're looking for.

MR. WESTPHALEN: Well, at this point we use the air flow that's listed in the product literature.

Any other comments or questions about that? I mean I guess the question is --

MR. CYMBALSKY: This is John from DOE.

So, since we don't have the test data -- I mean the analysis that we did was built off of the product literature using air flow and not the refrigerant set points. And the reason we can't do that is because we don't have them.

MR. THARP: The TSD says there were five systems that were tested, right? So, there's five sets of test data. Greg?

MR. WESTPHALEN: The test data do not include the pressure measurements.

MR. THARP: Okay.

MR. WESTPHALEN: Anyway, I think I'll move on. Bring me back to that later if it's still an issue.

Head pressure control one of the comments made was that the correlations developed based on the NOPR-phase data did not consider any change in operation at cool ambient temperatures, and so now what we will be doing is assuming that head pressure control starts to take affect at an ambient temperature of 65, and so that say the compressor input at temperatures below 65 would not be any different than it would be at 65.

We consider a reduction of condenser fan power below 65 in order to take into account either a reduction in speed or cycling of the condenser fans in order to achieve head pressure control. Any questions or comments on that?

MS. HOOTMAN: Just I think you missed the constant sub-cooling at the bottom.

MR. WESTPHALEN: Yes, good point. Constant sub-cooling in our NOPR-phase analyses we assumed that the sub-cooling didn't change as the difference in temperature between ambient and condensing temperature changed. And we are now scaling that sub-cooling difference with that ambient to condensing difference.

Okay, so moving to this last issue here, the capacity in EER trends versus ambient this relates very much to the same theme that the head pressure control issue did. That basically, in developing these correlations for the NOPR-phase some of those equations when taken to the full range of ambient conditions that were randomized gave results that didn't make sense. And so what we're doing is as part of the engineering phase evaluating those correlations and then plugging them back into the IER calculations to make sure we get back the same performance of the unit and all of the points down to the 65 Fahrenheit. And that might become a little bit more clear as go later on if we have time.

So, if there are no comments on that, I'll move on to the next page.

(No response.)

MR. WESTPHALEN: The next issue here as to do with micro-channel heat exchanges versus round tube heat exchangers. And this applies only to air the conditioning units and only the outdoor heat exchangers of air conditioning units. We're assuming that evaporators will not use micro-channel tubes and micro-channel heat exchangers and that heat pumps will not use outdoor coils that are micro-channels.

And so, we talked a little bit earlier that for some of the classes and efficiency levels that there are not that many units at those levels that we can consider in our analysis. And so, when we look at reasonable selections, we can not put together a curve that is all a round tube or all micro-channel all the way up and down the efficiency level scale.

So, what we're doing in this analysis is considering the performance of both round tube and micro-channel. And assuming that -- you know we've built our cost models so that there's essentially equivalent costs for either path, which may or may not be exactly true. You know we think that it's an industry in transition. You know some people may have lower costs. Some manufacturers may have higher costs with micro-channels.

MR. STARR: So, just a quick question. Isn't the other thing on micro-channels is you can get it in a smaller area? So, it sounds like isn't one of the upsides that -- you know just talking about the conversion curves if you don't have to increase the size of your casing if you use to micro-channel are you getting it in a smaller footprint such that you don't need things like your conversion curves, or does that not follow?

MR. WESTPHALEN: Well, yes, potentially, but you know with the approach we're talking, basing the analysis on the existing models we can point to the dimensions of the particular models whether or not they have micro-channels.

MR. STARR: But you also have limitations and the micro-channels can be designed and it has to be able to fit in the furnace, so you have the dimensional constraints.

MS. HOOTMAN: Yes. And the manufacturing of the micro-channel has constraints and so therefore it causes us to have constraints, so, no, not in every single case. We've actually had to grow our cabinet where we've used it.

MR. STARR: Is that why you use micro-channels to keep the case from growing a lot of time? I mean is it sort of like your first step things?

MS. HOOTMAN: No.

MR. STARR: No, okay. What is it, just like the technology?

MS. HOOTMAN: Lower leak.

MR. DOPPEL: It also eliminates a lot of problems that can be associated with dissimilar metals, especially certain applications.

(Sidetalk.)

MR. THARP: And one thing you have to remember too is most manufacturers will have Box A, Box B, Box C, Box D. You try to get your 10 ton or less in Box A. And you know the certain capacities in Box B. And you only tool up for certain sizes and if you can't get it in Box A, then you go to Box B.

MS. HOOTMAN: But Louis, literally, because of that aspect ratio and because of the way that they're made and their oven and how that production is it literally caused us to grow a cabinet because we couldn't get it in the size we needed it. So, don't take it for granted that it's going to do it.

MR. GOLLPUDI: This is Chandra from Emerson.

But even in round tube, you have different technology, different diameters, and all that, so that needs to be taken into account. I mean there are many ways you can -- manufacturers can reach the micro-channel cabinet advantages with different tube sizes and newer technologies.

MR. STARR: And a little bit where I was just going with that is the sense that this is a -- you know if you think about the conversion curve's part is whether you're putting on a replacement unit or not. But then I would say another element to that is, to the extent that you could use technology in order to keep you from going to the conversion curve. So, it doesn't seem like it's a panacea of everything. It's not going to solve every single problem, but it will solve a some certain portion of them.

And I don't know. I don't make or handle enough to know how many that is, but just another thought. I mean the same line of thought with that as well.

MR. DELASKI: I guess I'm not quite sure how to pose this question or who it's to, but so Jill when you were saying that it doesn't necessarily solve the problem of size because of the furnace interaction. Is that taking today's unit or is that back to my earlier formulation that, okay, a new standard goes into effect. That's going to go into effect three or four years from now.

You know now I'm going to redesign my basic compliance product. I mean do those issues start to get addressed as you redesign your basic compliance? Because you're not going to -- sort of we're trying to solve the multi-regulated problem all at once at this point. And I'm going to optimize. And Detlef characterized it as an industry in transition with respect to micro-channels.

So, this is the trend and so let's fast forward now to 2020 or 2021, whatever the year is, is that what we're going to be using in the outdoor unit?

MS. HOOTMAN: So, good question. And it's what we weigh against, what did we just talk about a half hour ago, we weigh that against the potential to replace ourselves and replace others.

So, yes, we might say that the aspect ratio is two to three or something for this particular heat exchanger and EVAP coils and we would optimize around it, but all of a sudden does that cabinet change so significantly that it now we can't meet up to the same curve and have those issues.

I'm going to tell you that the replacement usually weighs out over optimized design. It's a bigger deal for us because it's so much costs in the end run for our contractors to do those conversions will eat up cost in production probably.

MR. WINNINGHAM: This is Dave with Allied.

Andrew, the other thing we're kind of focusing on the air conditioning side, but part of this discussion is also around furnaces.

MS. HOOTMAN: Just to be clear, when I talk about furnaces of EVAP, of micro-channel you have to realize they get put into a furnace to make.

MR. WINNINGHAM: Yes.

MS. HOOTMAN: Okay, not be confused with the heating and air coil, the heating coil in a unit. Okay.

MR. WINNINGHAM: And in order to meet the proposed level, I'm not saying that that where we're landing. I mean the general approach would be more heat exchanger. And while there may be some areas where smart engineers can get around physics will win every time, and unless there's breakthroughs that require a certain amount of heat exchange circuits to do a certain amount of work.

MS. HOOTMAN: Gas heat exchangers we don't like to redesign very often, so they are one of our sticking points because they take a lot to redesign.

MR. WESTPHALEN: So, anything else on micro-channels versus round tube?

MR. THARP: It strikes me that there's an opportunity there that we're capturing in the analysis and I don't know how to capture that. So, to me, it's another conservatism in how we're modeling this, but I don't have a way to get around it.

MR. WESTPHALEN: I imagine if John gave us a year we could.

MR. CYMBALSKY: No.

MR. DOPPEL: Paul Doppel.

Jill, this is not like a three-year transition. This is probably more like a ten-year transition to that technology, the micro-channels. And just think about all the manufacturers.

MR. WHITWELL: Many manufacturers produce products with both, equipment with both, right? It's an option.

MS. HOOTMAN: It's an option. I don't

know. I mean I can only speak for myself. And our company it took us a couple, three years to change, so it wasn't forever.

MR. DOPPEL: But it won't be the main offering forever.

MS. HOOTMAN: Maybe not.

MR. DELASKI: But the reason why I thought the main offer is for the reason you were describing before. And the reason you're describing is this sort of different reasons why you might now make your main offering.

MS. HOOTMAN: Yes. And I agree. I mean you know a lot of us do produce our own coils. And in that case that's another whole investment to invested in those furnaces, et cetera, to make those micro-channel coils. So, it's a philosophy change of whether you want to build within or you want to go out.

MR. STARR: I'm sort of getting lost. So, the furnace size is set and so then the coil -- I'm trying to figure out what the relationship to the coil.

MS. HOOTMAN: The ovens that actually --

MR. STARR: So, if you change your coil it doesn't matter because that size is already set.

MS. HOOTMAN: Because now you start to get that aspect ratio is -- they only have so much give in those.

MR. WESTPHALEN: Unless they wanted to buy a new furnace, which, of course, is another proposition all together.

MS. HOOTMAN: Oh my, yes.

MR. WESTPHALEN: Okay, moving on here to this second issue on this slide. And basically, the bottom line here is that we have decoupled the energy part of the engineering analysis from the cost part. We are looking at development of cost curves. Costs as a function of IEER separately from development of the correlations that will go into building energy use models.

And this is because when looking at the cost versus IEER relationship we really want to look at as many models as we can, but in order to do that careful development of the correlations we just don't have time to do the full assessment of all of those models. And so for that reason, we've done this the decoupling here. I hope it's understandable what I'm saying here, and if you have a question certainly ask.

(No response.)

MR. WESTPHALEN: Then we have this third issue here is looking at additional efficiency levels. And for the analysis that we started showing last week, we added something that the team called the EL3.1, which was during the NOPA phase EL4. And then added at the higher level a max tech, which now is called EL4, which it uses variable speed, compressor technology typically at that level. And so I suspect there might be some discussion of this issue if anybody has any comments.

MR. DELASKI: So, Detlef, I'm glad that we addressed in our written comments to the docket both the need for max tech that really represents the max tech, which I think is DOE's obligation or one of their legal obligations under the rulemaking. I don't think we're going to negotiate a level of max tech. So, it's interesting, but I don't think it's really -- you know I'm not going to settle on the level, a new EL4.

To me, what we also asked for in our written comments was something to fill the space, which is quite considerable between old EL3 and EL4 from NOPR. This was a point that we gave some emphasis to in our written comments.

Last week on the phone you said that you looked for something there, but you couldn't find units to enable you to use the method that you were looking for. So, we took that under consideration and we went back -- well, it looked like to us what you were doing, the reason why you couldn't find units our hypothesis is that you were limiting yourself to those particular -- to the capacities -- to those precise capacities.

And it looked to us that if you let capacity vary by only 10 percent that you could, indeed, find units that would enable you to model something between old EL3 and EL4 to better fill that space. And to us that would give us a more complete consideration of the space between baseline and max tech, which was the argument in our written comments.

And we came up with -- I think the numbers if we let vary by 10 percent we came up with values of -- let me find it here -- for the 7 -ton unit -- their models is weighted at 15.5, multiple models at 15 tons, at 15 multiple models, and at 30, 13.7, which you just tick above the EL3, but the other ones it seemed to us they filled that space a little better, and I think are more interesting.

I'm glad you're doing max tech, but I think is more interesting in terms of filling that space to give some variation there to not use that tonnage as a rigid determinate of being able to find a unit. So, I hope you can model those as well. And again, so just linking back to the comments we've been making all along.

MS. WALTNER: So, to further on to kind of what you're saying is that absolute tonnage then because of the energy analysis to try to keep it exactly what it is?

MR. WESTPHALEN: Yes. I mean if I say I'm modeling a 25-ton unit you know I need more units. I don't get quite as much capacity out of a 25-ton unit. The cost differential -- like if my cost differential is a thousand dollars with a 25-ton unit how does that compare with the same cost differential on a 30-ton unit? So, there are some questions. You know if we do this we have to sort of resolve those questions. I think that could be resolved, but we just have to be careful making sure that ultimately apples to apples.

(Sidetalk.)

MR. DELASKI: Excuse me. For the 10 percent that scaling you should be able to a scale -- you know find factors to scale. If we're getting further off that then maybe those scales might not be as reliable, but within a pretty close range is the concept that we had.

MR. WESTPHALEN: Yes. On the first cut, assuming that you would scale your cost by the capacity you know would sound reasonable you know within plus or minus 10 percent.

MS. HOOTMAN: And I was just thinking,

just doing the math a little bit. So, you took a 30 ton and it became a 27 ton and while that sounds like it's still within the same, it's a completely different product for me.

MR. DELASKI: How about at the 15 ton level with the 7 ton level?

MR. CYMBALSKY: Can everyone just use their mikes, please?

MR. WESTPHALEN: Yes, there are some places where there are platform step ups like you know Rusty was saying Box A, Box B. And so, in our analysis -- you know certainly in the cost analysis we're aware of that and we're trying to make sure we properly account for that.

MS. HOOTMAN: Yes, it does appear like it's going into a whole cabinet size in every single case because a 15 ton goes down to 13 , which is really that probably falls into a 12 ton more nominal. Wouldn't you guys agree? And then that's a different cabinet for all of us or a different unit. That was the case in the 30 ton. And I haven't done the math on the -- let's see what I have -- yes, six and a quarter, and that's a different unit. I do see the issue. It's become hard.

MR. WESTPHALEN: On a cost curve, you could imagine that you know it might be acceptable to interpolate at an intermediate level.

MR. WHITWELL: The cost is going to go somewhat in steps. The cost is not going to be a straight, linear relationship as you go up through the different chassis sizes, though, right? If we're talking about jumping from one chassis to another chassis size, it's not a linear cost different.

MR. WESTPHALEN: If you are jumping chassis sizes of course.

MR. WHITWELL: Yes. Right. And that's what we're talking about is probably this is what's happening here is you know you go up or you go down 10 to 15 percent in capacity you could be in the next smallest chassis size or go the other way. You're in a small capacity in a bigger box, so your efficiency is going to be higher there and so that could give you a substantial jump in efficiency, so it makes it look like -- I mean you can't see what's happening unless you're actually looking at the size of the box at each capacity size going on up through the line.

MR. WESTPHALEN: Well, I guess it's for the group to recommend whether we should consider another intermediate efficiency level. And you're right there is a big jump from EL3 to EL4. I'm not quite sure how do deal with that at this point, though.

MR. WHITWELL: You're right. There is a big jump from EL3 to EL4. I'm not quite sure how to deal with that at this point.

MR. DELASKI: Is it possible to capture that cost of chassis change, so the question is how do you capture that.

MR. THARP: Rusty with Goodman.

I guess one of the concerns I have about having additional efficiencies levels for consideration is the timeframe again because we have such limited timeframe, but if we are going to add in addition ELs, I think we may want to consider like a two and a half also. Because I mean once you get to a justifiable number to me -- or I guess we're sort of thinking that the best justifiable number may be something less than EL3, but maybe more than two.

So, if we're going to throw an additional analyses, let's look at those. But again, I'm not sure we have the adequate time for additional levels, but I do agree that between three and our it would be good to have some other levels in between.

MR. DELASKI: So, I mean the challenge is that you just can scale it. So, I mean it's easy to add these levels if you just could scale, right? And you guys are arguing that you just can't do it. You got to have a unit there.

MS. HOOTMAN: Well, I don't know that I'm arguing that you can't. I just want to go back and look at what that means in cost and will it be a fair way of looking at doing a curve and just picking up a curve. I can't visualize that yet without some data to look at that.

MR. DELASKI: Okay, so I just would put it back again to you guys, to the manufacturers, and to the consultants to consider because I'm all for two and a half too, right? If we can populate -- for the negotiations, right, the more options we can put on the table the more dimension we create for positive outcomes, right?

MR. STARR: This is Louis with NEEA.

On the second one, the decoupling analysis with the cost start, can you briefly explain what you did originally? And think, if I remember, my understanding of why those were decoupled was because the power profile for the air handle was laid off and that's why you decoupled it, but maybe you can just briefly explain what the reasoning was for the change in your analysis. Maybe what the original was and why you changed it.

MR. WESTPHALEN: Well, in the NOPR-phase we developed models you know using the coil designer. You know the University of Maryland tools. Some of those were extrapolated off of the test units or perhaps a catalog unit. And then we calculated costs for the design associated with that unit. You know sort of piggybacking off of information we had about a reversed engineered unit, so you know say we know how large the heat exchanger is.

Basically, the extrapolation on the cost from say the tested and reversed engineered unit as well as the energy side. And so when we got into this approach of basing the analysis or the energy side of it on existing units, you know when you select your existing units you have different manufacturers taking different approaches and then you construct the cost curve and it's all wavy and it doesn't make any sense because of the particular strategies that one manufacturer took versus another.

And one manufacturer may be at the large end of the small box and the other one might be at the small end of the large box, so then the cost curve doesn't look right. And so we decided in the cost curve analysis we need to look at many more units to get a better industry average, so that's why we took this approach.

MS. MAUER: This is Joanna Mauer.

I just wanted to provide a little bit more information about the specific unit set Andrew was mentioning. I think they may be a little bit closer to the actual capacities than the full 10 percent.

So, for the 7   ton units it looks like they're units at 15.5 that are at 96,000 BTUs, 7   tons is 90,000, and then for the 15-ton units it looks like they're units at 174,000 at 15.0 IER. So, I don't know if those capacities are close enough to the representative ones to make it a reasonable --

MR. WESTPHALEN: I mean this is something we can look at. And given the pressures of the time versus more data, certainly whatever the consensus winds up being we'll do what we can to get the numbers as quickly as possible.

MR. CYMBALSKY: And so, as we go through these points, I've been making checkmarks when I don't hear anybody say anything. So, just so that you know from -- you know I'm being honest about it, so when I looked around everyone's shaking their head, nobody commented. I'm assuming what that meant what Detlef explained in his approach the team was taking that there weren't any -- or at least at the time there aren't any -- there's no prevailing wisdom to do something differently. So, I hope I'm reading the group the right way.

MR. STARR: I think I would be up for them doing an additional level, as we suggested.

MR. CYMBALSKY: For this point, I did not make a checkmark. There are a couple other ones where I did. Until Louis just spoke up about the decoupling, I had a checkmark, but I think I still have a checkmark. But I just want to make sure that we're not just -- you know Detlef just asked a great question that is based on the consensus of the group we will do X, Y, and Z.

Well, we don't have a lot of time to do X, Y, and Z, so I want to push us along to say, okay, we all think 3.05 is good and we think, I don't know, 2.75 is good too, but you know we don't have three weeks to come back here. So, kind of think about that, and as we go along, let's try to make decisions when we can.

MS. WALTNER: So, starting on the intermediate efficiency levels, I just want to add my support that I think that adding levels is I think a very important step for us in this process. So, I'm just adding my support there.

MR. CYMBALSKY: And that's great. I mean we can do it. So, the real question is do we hit the step function, and I think that's a valid concern in both directions. And we may not know the answer on the fly. I understand we need to look back. So, if we go to the levels that Joanna just brought to our attention, do we hit the step function in a chassis swap out, for example?

I don't think we know that. We don't have -- I don't think we do at the moment to know that answer.

MR. WESTPHALEN: I don't think it'll be a hard and fast answer. It depends on the manufacturer.

MR. CYMBALSKY: And my sense is that if the manufacturers can do -- you know forget about the standards for a second, but if there was a way to get that extra incremental efficiency level without that big investment in chassis or whatever box side that you would do it. We just don't know if you can at the moment. We haven't examine it, at least that's my theory.

MR. WESTPHALEN: Yes, we would attempt to analyze this based on the existing models and whether or not if there are steps -- you know increase in sizes that then make that curve non-linear in that particular regions, then that should come out of the cost analysis, given the information that we have.

I mean what I think what I would be interested in know is getting a consensus. You know I hear potentially two additional levels. Is there consensus that we're going to do two? And if there is consensus on two, roughly what would those levels before for each of the classes.

I mean that's a lot to ask and maybe that's not going to come out of this meeting right now. Certainly, from our perspective if we're going to have those results for engineering and LCC in say two weeks time, we really need to know what we're doing right now as I leave the room.

MR. CYMBALSKY: And so that was my point I think. So, Andrew and Joanna, from their perspective, what they're trying to do is squeeze a little bit more efficiency without hitting that step function. Is that a fair characterization? And so I guess the question to the group is do we think is it 3.05 or 3.0 -- I mean we know 3.1 might make that chassis change, or whatever it is that was described, but do we think there's another sweet spot in there by I guess altering the capacity a little bit.

MR. DELASKI: I'm fully supportive of 2.5 if that helps to -- I mean we're trying to characterize that curve. I mean we know what the particular point is. We don't know what the sweet spot is in terms of -- .

I like the idea of plug in both of those spaces more completely. You know put on the table a way to get to something in that -- I'm not used to the terminology, in levels.

MR. WESTPHALEN: Yes, I think for the 2.5 the question of what the level is is much more straightforward. We just take the average and that's our target.

For the level that's just above three, I don't know, do we want to go halfway in between? Do we want to go you know a portion of the way from the three to what's now the 3.1?

MR. DELASKI: (Off mike.)

MR. WESTPHALEN: And then roughly how much IEER.

MR. DELASKI: (Off mike.)

MR. CYMBALSKY: Can you hit your mike?

MR. DELASKI: Sorry. They were the values that I read off earlier, which again I found before. Here they are. So, that was -- at 7 tons it was 15.5. ELR is 14.8. So, we found models at 15.5.

MR. WHITWELL: And that was 96,000 BTU per hour?

MR. DELASKI: We found models in the 15 ton range. We found models at 15, and that was 174 and we give, Detlef, the models. We'll show you the models. We just pulled them off the HRI directory.

MR. WESTPHALEN: Yes.

MR. DELASKI: And EL3 -- I'm sorry. At 30 tons it was 13.7. EL3 is 13.5. So, it wasn't much of a change for the 30 ton. At 30 tons, EL3 is 13.5. We saw models at 13.7. It may have just been one. Maybe it's Jill's model. I don't know. She seems to know that number. Anybody can check the HRI directory, but those are the levels that we ^^^^ you know those levels are well below the midpoint between three and four.

MR. CYMBALSKY: Does it make sense to focus on the 7 and the 15?

MR. DELASKI: Yes, I mean just from a pure impact point of view, right? We're not talking -- that would be where the --

MR. CYMBALSKY: Yes, I mean the more we can narrow the focus the better off I think we are.

MR. WESTPHALEN: Okay, so does it sound like we're talking about the two and a half level for all three classes, but then above three for just the 7 and 15?

MR. DELASKI: It makes sense to me.

MR. CYMBALSKY: It sounds like where the action is. I mean I would vote for that.

MS. HOFFMAN: Do we have a consensus to give some direction and then be able to move on?

MR. CYMBALSKY: I mean the one question we haven't settled on is -- so for the 7 and the 15 ton, do we think what the found in the directory we can do some cost analysis to get there or we haven't hit that yet?

MS. HOFFMAN: We haven't hit there yet.

MR. CYMBALSKY: Okay, that's the last piece is do we hit the big step or do we hit some scale.

MR. WESTPHALEN: Well, I mean I think we would ^^^^

MR. CYMBALSKY: You would try to figure that out?

MR. WESTPHALEN: We would try to figure that from the data we have available to us.

MR. CYMBALSKY: Okay.

MR. BATTAGLIA: (Off mike.)

MR. WESTPHALEN: Well, James, I don't know. Is the plus or minus 10 percent already in there of the cost analysis currently?

MR. BATTAGLIA: It may be. I think we ought to back and look, but I think that plus or minus -- we looked at the nominal capacity, so that might have captured that. We definitely didn't have that 15 IER unit in our sample when we did it.

MR. WESTPHALEN: So, we'll have to look back at our data and figure out what we can do there, but it would be useful to have the models. And we'll have to do some thinking about like if those are gas-heat models and we're mostly looking at -- I mean just some discussion about whether it should all be gas heat, but I know we've kind of gone down this path and we'll probably stick with it. But yes, I mean it would be useful to have the model numbers.

MS. MAUER: This is Joanna.

The SPA models in the HRI directory are all non-gas heat; is that right?

MR. WESTPALEN: Yes.

MS. MAUER: Okay, so that what we were looking at for these.

MR. WESTPALEN: SPY is gas heat.

MS. MAUER: Right. Yes, so we were looking at the SPA models.

MR. DELASKI: We'll give you the units. We'll just give you the little spreadsheet.

MR. WESTPHALEN: Okay. Good.

MS. MAUER: So, I'd like to move back to the cost point if we're done discussing intermediate ELs.

MS. HOOTMAN: Getting more cost data is going to be hard out of us. At least I'm going to speak for myself. It takes a lot. I have to dedicate an engineer and a finance person to sit down and pull this stuff, and it doesn't happen overnight. It takes me weeks.

MR. CYMBALSKY: All right, so I think we're going to take a crack at it, that's what I'm hearing.

MR. WESTPHALEN: Yes.

MR. CYMBALSKY: And then we'll bring the results out and see what they say. I really wanted to finish this slide.

MS. HOFFMAN: He's hard. I've already tried for a break one.

MR. CYMBALSKY: Only because the topic switches to buildings after that.

MS. HOFFMAN: By the way, do you have your marching orders on the earlier run with the 2.5, what you're going to do?

MR. CYMBALSKY: Yes.

MS. HOFFMAN: You're all set? Okay.

MR. CYMBALSKY: So, I think there's just one more topic left on engineering.

MR. WESTPHALEN: Well, Meg wants to go back.

MS. WALTNER: Yes.

MS. HOFFMAN: Not so fast.

MR. WALTNER: That was the second half of the comment I was trying to make earlier when I let you respond to me. So, my understanding of the way that you changed the cost analysis before you were building up the cost based on your modeled equipment and now you're using the cost for actual equipment, actual cost data that you have equipment available today. Is that an averaging cost over you know the models that you have that data for; is that right?

MR. WESTPHALEN: Yes, basically, we go to the product literature and look at all the models that we can. And the key designed details like heat exchanger size. And fortunately, for a lot of the manufacturers there's a lot of information there that really helps in understanding how big are the heat exchangers, what compressor are there, what kind of finds, and all of that information feeds into the cost models. And so then we estimate costs for all of these models and we've tried to get feedback directly from the manufacturers under nondisclosure agreement as to how close we are on those estimates. But you know then we have these estimates and then you can put that on a scatter plot of costs versus IEER and then try to figure out, okay, what's the trend.

MS. WALTNER: Right. Okay, that makes sense. And I guess I would just raise the flag as we're doing that. The point, though, has been brought up a couple times that the high efficiency models today are not the same models that would be the high efficiency models if the standard was brought to that level and sort of how that would affect the cost.

MR. WESTPHALEN: Well, yes, and we then estimate our costs at those different levels based on full production quantities at those levels.

MS. WALTNER: So, it sounds like that's already something you're doing.

MR. WESTPHALEN: Yes. And what we're not doing is looking at future designs that we can't conceive of yet.

MS. WALTNER: Right.

MR. BATTAGLIA: I just want to follow up on the issue with that 3.05 level or whatever. One of the issues I think, and I'll verify the model, but some of these spreadsheets don't provide all the information that Detlef was talking to like the heat exchanger sizes, compressors, and such, so that becomes another issue. We can't model that for the cost or the energy modeling if we don't have the data for those units.

MR. WESTPHALEN: Yes. We don't have complete data of the full industry necessarily.

Shall we try to move onto the last item here, the coil circuiting?

MR. CYMBALSKY: Yes. Because my math is we have three hours and 15 minutes after lunch and at

3:15 it'll be exactly half and half with 15 minutes in the middle.

MS. HOFFMAN: It's great when you work with engineers, right?

MR. WESTPHALEN: I can make it.

MR. CYMBALSKY: Come on, we're almost there. Come on, we really have a good reason to move forward.

MR. WESTPHALEN: I believe this is a fairly small issue here. In cases where we're considering staged air, we are using intertwined circuits or front/back circuits for the split if there's two circuits, each serving a separate compressor in order to limit the impacts of reducing the air flow. You know if you have a staged or a VAV so that all the air flow has interchange with all of the evaporator for the given circuit, even when the second compressor is not operating.

I don't think anybody is going to have any argument with the concept, maybe some argument with whether we're getting the results 100 percent correct.

(No response.)

MR. WESTPHALEN: John doesn't hear anything.

MR. CYMBALSKY: And I don't even know what you're talking about.

(Laughter.)

MR. CYMBALSKY: An economist. I don't see any dollar signs in there.

(Laughter.)

MR. THARP: Rusty Tharp with Goodman.

I'll say that from a perspective of the staged air flow that's the correct thing to do. Agreed. But another thing that needs to be taken into consideration is the number of circuits per refrigerant circuit and it's potential impact in the measure versus actual performance as you change efficiency levels. Because as you increase your coil volume surface area if you keep the same number of circuits you've got a different pressure drop per circuit. That needs to be taken into account. And if you change the number of circuits, then that also the impact needs to be taken into account.

So, that would be interesting. I was unable to participate in the last two equipment modeling sessions, but I would like to make sure that those issues are addressed in the modeling because it can make a major impact on what is estimated to be required to hit a certain efficiency level, one way or the other. It could cause an overestimation. It could cause an underestimation. So, it's needed. I'm interested in seeing the details of the input for all the various models just to make sure that there's nothing that sticks out like a sore thumb.

MR. WESTPHALEN: Yes. I imagine that might be guidelines in terms of rules of thumb of how much pressure drop do you want to see in an evaporator, how much do you want to see in a condenser in order to get the right number of circuits. The product literature doesn't show that, so we're kind of going by those kinds of rules of thumb. And if you want to have like a sidebar meeting to go over some of that or provide some guidelines, certainly, I mean we're open to that.

MR. THARP: I think it wouldn't be a bad

idea to either create a subgroup or continue the equipment modeling subgroup from previously to review some of those details, probably as quickly as possible, obviously.

MR. WESTPHALEN: Okay. Well, let me think about --

MR. THARP: We can have some sidebar conversations also in addition.

MR. WESTPHALEN: Yes. Let me think about what the best way to try to have that conversation without having the team just stop what they're doing and then try to get back to you on that.

MS. HOFFMAN: Now, would it be fair to say that it's break time. Come back in how long, 15 minutes? What is it, 3:30? We'll see you back here at 3:30. Thank you.

(Whereupon, a break was taken at 3:16 p.m.)

MR. CYMBALSKY: I'll turn it over to Greg Rosenquist from LBNL to go through the work that's been done in the buildings modeling part of the analysis.

MR. ROSENQUIST: Hi everyone. So, hopefully you can start thinking about buildings rather than equipment modeling. You'll refresh your mind.

A lot of these issues were identified out of a meeting that was in Berkeley on March 19 and 20th. So, I think a lot of them have been resolved, at least on this slide, but of course, if not, certainly let me know if you think differently.

The first one has to do with the design temperature for the system sizing. Blast is a simulation model that was used to determine the energy use of this equipment, and from that building loads were backed out of. And in that calculation, they also determined the system size for the building. And for that calculation it was assumed that it was based upon a 95 degree design temperature, but that was incorrect. It should be actually one percent cooling dry belt design temperature, and that change has been made. What that has the affect of doing is reducing the number of units that serve the building. So again, that's been done and the most recent files have been sent to the working group. Again, I believe that one's resolved.

We talked about it briefly in our last call, but from my understanding I think that was taken care of.

MR. FERNSTROM: So, this is Gary.

I have a question about that. You're saying that revising the design from 95 degrees to 1 percent cooling dry belt design results in a reduction in load and a reduction of the number of units needed to serve buildings?

MR. ROSENQUIST: Well, the system size is based upon the design temp, so for a lot of these buildings it's around 90 degrees Fahrenheit rather than 95. And so if you go ahead and use that as opposed to 95 that ends up resulting in just less units having to serve that building.

MR. FERNSTROM: Okay, I understand. I just wanted to clarify that because you know where I live the design temperature might be higher than 95, but for the nation as a whole. Thank you.

MR. ROSENQUIST: Yes. I mean the examples I had done were not in California or Central Valley, I should say. So, there I think the design temp would be about 95.

The next issue was the load factor. And it's important for determining the cyclic degradation of the unit, basically, how often the unit turns on and off to meet load. And in the analysis performed for the NOPR, it was determined that we had an incorrect calculation there. The load factor was determined across all the stages of equipment as opposed to just the upper stage that the equipment was in. So, this would really affect things or this does really affect things when the unit is beyond its first stage if it's a two-stage unit or a three-stage or four-stage unit.

This correction can have a significant affect and it does for 7 -ton units, especially going from single stage to two stage. Also, there was another correction that had to be made where there was an assignment of a degradation coefficient of one whenever the unit was in its highest stage of operation, so that's also being corrected.

So, the top two items have already been dealt with and the file sent back to the working group. It's reflected in those files. What we're further going to do based upon input we've heard from the working group is the units -- many of the loads that we're seeing are times when the unit operating in both heating and cooling. And so the cooling load is relatively low during this time and we have the assumption that all the units in the building are running during this time. And as a result, often the units are running at below 25 percent part load.

So, a better way to handle this we feel is to have only a certain number of units serve that load. And we haven't exactly thought through the numbers of units, but we're thinking that perhaps have units bunched in sets of 10 perhaps, maybe 8 or 9 or 7. Whatever that number is we're looking for input, but basically saying that if 10 units -- if the unit's being served let's say by 20 units and that load can be met with 10 of them or 12 of them, then we would reflect that on the analysis and that way the equipment then wouldn't be in such a low part load condition as we're currently assuming and so this revision and this method then will result in calculating the cooling load for a smaller number o f units and thus, they would be at a higher part load condition.

MR. STARR: This is Louis with NEEA.

So, I guess maybe an example -- so what you're thinking about is maybe say a large retail space of some sort. You're saying that you maybe have 20 units serving a retail floor or something. You assume those loads, so you assume that 10 of them would be running to meet the load and the other 10 would be off; but in reality each one -- I mean it seems like each on of those might have a thermostat and sort of be zoned for first flow.

For instance, in a retail space you would have maybe an electronic section that would have a little more load than the clothing section, right, or actually maybe the reverse because you have more lighting on the clothing. I don't know. But anyway, there could be actually different things in there so that it seems like those units could really not cycle 10 at a time. I mean that would be great if they did, but I don't think that's how they would work.

Help me to understand what the --

MR. ROSENQUIST: I guess I was thinking more about an office building where you have core and parameter zones. And maybe that's the thing to do here is just apply this method to only office buildings rather than retail.

MS. HOOTMAN: But retails going to have what he's talking about, where other areas are not running, but there is light load are. So, you're in a Macy's and over the cosmetics counter has got the light load and it's going to happen, but in other areas it won't, so you'll have that switching on and off.

MR. ROSENQUIST: A lot of blast output we're seeing you know instances where there's both heating and cooling and so we would be applying this method -- potentially applying this method when we would see that type of condition occurring in the data.

MR. STARR: So basically, it where you have a different kind of system which is probably more VAV with reheat like a large office building where its parameters you might be heating because it's a cold morning. And meanwhile in the center of the building it's pretty hot because everybody's in there making lots of heat and so you're trying to compensate your output to make up for that by making this assumption that you're doing.

So, I guess that maybe okay; but yes, you certainly would be based on certain kinds of spaces like the certain models of the 10,033 that have that, but I wouldn't say you'd want to do that across the board.

MR. DOPPEL: Paul Doppel with Mitsubishi.

So, it seems to me that you're going to have different levels of energy usage when you do that and different efficiency levels. And it would just seem if you consolidated to 10 instead of 20 that you're going to have a different performance characteristic than the other.

So, does that increase energy savings?

So, that's kind of the whole issue here. So, if the systems are not capable of doing that themselves, then you're trying to replicate what reality is and not what's easy to do.

MR. ROSENQUIST: If you're going from a single stage to a two stage, right, you'd see a dramatic -- probably a significant change in the way energy is being consumed in that building, right, because for the two-stage unit you can better meet that load than in a single-stage unit. So, in going from two stage to two stage, it could be a different situation.

MS. COUGHLIN: This is Katie from Lawrence Berkeley Lab.

I was just going to say I mean the initial idea here is to construct a sensitivity, so you know obviously we're not going to be able to capture all these nuances, but right now we have one very extreme case that's being modeled where all units are operated as a single unit, which in a building with 50 units is not a realistic assumption.

So, we're going to change that assumption and we can look at what the impact will be. And I think you know these details will be more -- it'll be more productive to discuss those once we have the new calculations.

MR. ROSENQUIST: Okay, so onto the next one, which I hope isn't controversial any longer. It's about the fan speed when the unit isn't heating, space heating.

We went around on this a bit, and I think we've all decided that it should be in high speed. And for the inter-fan space cooling, what was done for the NOPR is that there were all these correlations where power was a function of dry belt temperature. And actually, there were some cases for some efficiency levels there was no low limit on that, so you could actually get down to a pretty low fan wattage in some cases.

So, moving forward, we're just going to have the fan power be a function simply of the stage that you're in. I think again there's consensus on doing it that way. Also, on something that will have less of an effect is that we'll use the load factor to determine the energy used when it's in a high stage rather than just this percent in value that we were getting from the blast output.

MR. STARR: So, just a question on that. So, when you're in economizer mode, that fan energy's counted somewhere else or how do you take care of that fan energy because you're still cooling, right? When it's 60 or 75 in here and you've got nice, cold outside air you know you turn on the economizer. You won't be turning on your compressors, but you'll be pulling in air and your fan will probably be running on its high speed, so it's being captured somewhere else, right?

MR. ROSENQUIST: Well, you know at least for the buildings we've been looking at there's very little time that the fan's actually in ventilation mode. It's either in cooling/heating or heating and cooling. And again, you know it's hard to tell how much economizing is going on for a building that has an economizer and blast.

So again, we're just keying off you know what stage the equipment -- I mean we're keying the fan power consumption off what stage the cooling is in or if it's heating we put in high speed for heating. So, that's what we're currently doing.

MR. STARR: So, that basically means the fan energy you're picking up and probably outside air temperature of 75 up you're assuming some kind of staged compression, and below that? But you k now there is cooling happening there. It's just not staged compressor.

MR. ROSENQUIST: Right.

MR. STARR: It seems like you should be trying to capture that somewhere. I mean it's not ventilation, right? It's really cooling. I don't know. It's hard to capture; is that the problem?

MR. ROSENQUIST: Yes, it is hard to capture, at least again with the data that we're dealing with.

MS. WALTNER: This is just a request. You said that the revised analysis on the first two points had been sent to the subgroup. I'm not sure I got that, so if that could be posted on the share point, once it's up --

MR. ROSENQUIST: Okay.

MS. WALTNER: -- or make sure it's sent around to the whole group. Thank you.

MR. DOPPEL: Can that request apply to all?

MR. ROSENQUIST: Yes.

(Sidetalk.)

MR. ROSENQUIST: I think Louis is a little uneasy with the indoor fan for space cooling.

MR. STARR: I would say if we were to look at the number of economizing hours like in Portland there's a lot of them. I want to say two to three thousand that were not actually -- every morning we don't actually turn on the cooling until about 11:00 or 12:00, and we're definitely cooling and we're --

MR. ROSENQUIST: Let me just revise my statement here on the fly that, again, for the buildings that we've been -- this handful of buildings we've been looking at more closely for the spreadsheet calculations, again, like I said, there's very, very few hours, if any, that it's in ventilation.

Now, I'm not looking at a building in Seattle or Portland or a place where there could be a lot more economizing going on. And in that building perhaps it is in a mode where it's economizing a lot when there's no mechanical cooling or heat, but the fan's on. And in those cases, and I hear what you're saying. What you're suggesting is have it be in a high speed mode during that time.

MR. STARR: Yes. Or at least be counting the fan energy in some way, yes. But most likely, it would be pretty much going full out. And you know Climate Zone 4 is quite a bit -- you know it's not just Oregon. It's through the center of the country and on up. And you know also when you get into the higher -- five, six, seven those also could be using economizer too a lot rather than using compression. The same thing in the mornings until lunchtime or whatever when the air heats up you could still be using all of that free cooling. It seems like there's a lot of hours there. I'm thinking in the order of two to three thousand, but I'm not sure.

MR. ROSENQUIST: What I'm hearing then is that when the blast output that says that the fan is on, right, and it's not heating or cooling then what we would do in that circumstance is bring the fan speed up to high.

MR. STARR: I think a portion of it is ventilation, right? In the wintertime, you wouldn't want to be pulling in cool air, so it'd be ventilating. The summertime, you could be cooling or you could not be. It depends on the set point in the room.

MR. ROSENQUIST: I mean what I have for that hour, right, whether it's heating, cooling or heating and cooling, or if the fan's just on, right, without any of those three things going on.

MR. CYMBALSKY: So, how does it impact the analysis, though, as we step through IEER levels?

MR. ROSENQUIST: Well, this is just for calculating energy savings from a particular piece of equipment, right? And in this case, when it's in economizing mode, right?

And I guess what I'm saying here is at least during cooling, heating and cooling and heating

I meant the fan speed is being specified by the methods I've just described.

MS. COUGLIN: So, it's possible that we're currently underestimating the base case energy use during ventilation only. And depending on the efficient improvement associated with the fan going to higher yields we might get a slightly higher energy savings, but I think the fraction varies. I mean even in -- in some areas it may be significant, but when we do the national building sample I don't think it's going to be a very large -- I mean it'll be in the order of a couple percent probably. That's my guess.

MR. DOPPEL: It's Paul.

I don't know whether it's connecting or not. I mean the only other thing is this maybe while your post-processing the economizer you could capture it somewhere in that area too, and post process that. But if it only gets to make a big difference in the analysis, then I guess don't worry about it.

MR. CYMBALSKY: I mean that's kind where I'm focused right on this issue because it seems to me if it's really on the order of 1 to 2 percent is it going to change the policy outcome, which is I think the important part here.

MS. COUGHLIN: We can do a sensitivity order. We can go ventilation hours and just go from there to high speed and look at the impact on total energy use and that will give us an upper bound on the change.

MR. ROSENQUIST: Well, talking about economizing, again, the formal working group has been discussing this for a while now. And you know there's two proposed approaches I've put up here. One is somehow validate that the blasting relation output for economized building is fine, and I presented a slide in last Friday's call to try demonstrate that. And the other option is post-process blast output for buildings that are not economized into an economized building.

And so the input we're looking for here from the group is does one of these methods seem fine or is there another method that could potentially resolve this issue? I feel like right now it's definitely unresolved. And again, we're just proposing a couple of methods here to try to take care of it.

MR. DOPPEL: Can we call a friend?

(Laughter.)

(Sidetalk.)

MR. DELASKI: So, when I heard things on the phone call -- this Andrew -- Greg you were describing on the phone that in the blast simulation -- or as you understand it I think you said it was 35 percent of buildings, but that the square footage was more like -- a much larger number, like 70 or 80 percent. So, I guess I needed to understand what do you think is happening in the blast model?

MR. ROSENQUIST: Yes, so this is the slide I had presented last Friday on the phone call. And on the left are the non-economized buildings. On the right are the economized buildings on the blast, and comparing both cooling load on a regional basis for all the buildings in that region. And then the bottom table is an average cooling load per square foot. And just trying to get a sense maybe of if blast is doing something with regards to economized building to reduce cooling load.

And the take aways I had from this I think you really should ignore that building count because I think you really want to look at the cooled square footage is that two-thirds of the cooled square footage being analyzed, at least in those blast simulations was with economizers. And the other big taw away is that is that at least on a national basis the cooling per square in economized buildings is lower than that in non-economized buildings.

Now, it does definitely vary by region. And in some regions during the summer, for example, it's actually higher. Region 7 is Texas, Oklahoma, and Louisiana, so it's a question there if economizing are even all that effective down there for them.

So anyway, that was the purpose of this slide is to try to at least get a very, very high level sense of whether or not blast modeling is at all decent. The other slides I had presented in the previous day's call were talking a non-economized building and using this method here to turn it into an economized building. And that involved calculating the absolute humidity on an hourly basis for each one of these, these 8760, the 8760 being 8,760 hours a year, and comparing that to the indoor conditions of the air.

And this is a big assumption here. You're assuming that the indoor air is maintained at 75 degree dry belt, 50 percent relative humidity, but if you satisfy these two conditions -- if the absolute humidity of the outdoor air is less than the absolute humidity of indoor air and your outdoor dry belt temp is less than your indoor dry belt temp, then you're going to economize. And that last equation shows you how much you're going to reduce your cooling load by when you're economizing. And what that ends up doing is -- West Palm Beach is not a good example here, but let's take Baltimore.

This Baltimore building, which on the left it shows you the building load as a function of dry belt temp, and what would happen to that load if you applied this method. And in total, you're going from

1.4 billion BTU's of cooling load in that year to just over 1 billion BTU's cooling load in that year.

Again, there's a lot of simple assumptions behind this, but that's the affect of using this method. So, it was roughly a 35 percent reduction in cooling load for that particular building.

MR. STARR: So, I guess I have a couple of thoughts. So, really the calculation that you're doing is probably what the energy model in blast is doing, right, I suspect if not -- you know those equations are not new. Those are old equations and so I suspect the other one is doing it. What the difference is is coming up is that in your calculated model it assumes that all of the economizers worked perfectly.

And in the blast model, I think in the A NOPR in the appendix it talks about two things, a failure of the economizer at a certain rate and I think it talks about ventilation here, and I don't know if that affects it or not. But essentially, one would assume that the economizers work perfectly in the math, unless you were going to do something different with your math now, and I'll assume that they don't. And I think that's what the difference maybe between the blast models and the non-blast models or just the straight calculation are.

And so that's I think what -- when you presented the options of "A" and "B" there, that's really what you're getting to. If the post processing assumes a perfect economizer and the blast models do not, to my mind that's always what the difference was. When Dick was looking at the two building profiles my thought when I looked it at was, yes, they just didn't check the box for economizers working and that's what you're seeing, but I don't know if that's everybody's take on it or not.

And I mean to me that's what the difference is, and so when you talk about which one we should use I mean the blast one is conveniently already there and we don't have to do anything with it, so I like that. But if we did "B" with some kind of failure rate, I'd probably be okay with that too.

MR. DELASKI: Just a follow-up question, Greg. This is Andrew.

So, when you show two-thirds of the square footage have economizers, those are functioning economizers?

MR. ROSENQUIST: Yes. So, of that two-thirds, 30 percent of them are assumed to be inoperable.

MR. DELASKI: Thirty percent of the two-thirds are inoperable?

MR. ROSENQUIST: Yes.

MR. DELASKI: I'm just trying to sort sync up the numbers from our call last week. There were some numbers tossed out. I couldn't identify all the voices on the phone, but some people say 80 percent of the units are shipped with economizers today. That was one number tossed out. So, 80 percent being shipped today isn't that far off from 67 percent in the stock having economizers. So that would suggest that the stock is pretty stable.

I had initially heard that the one-third of the ^^-

MR. ROSENQUIST: That was on the building count.

MR. DELASKI: -- the building count, but now when you ship to square footage it starts to sync up more clearly with the numbers that were being shared by manufacturers last week.

And then on the -- the question is of the failure rate. And you know I had shared a paper last week -- you know I don't know. I mean I guess I would look to the community as to whether this reasonable failure rate.

MR. DOPPEL: You know last week Dick Lloyd shared the story of economizers being shipped with the unit and related it to a store just down from his house where you have the rooftop unit and the economizer was still on top where it was shipped with the unit, but packing, the shipping is still on it.

MR. DELASKI: Hopefully it'll lower the install costs too, but maybe not.

MR. STARR: So, I mean I think the reality is it's not necessarily that all times people are putting ^^^^ well, a couple of things happen. The common one is maybe they don't get installed. The other thing is they set them so that they won't work, whether it's disconnecting or adjusting the settings, but a lot of things can happen on these air economizers. And actually, Steve Taylor, who is also 90.1, has a whole article on the interpolate economizers and how they're the worst ones out there and they're sensitive to a lot of failures.

So, I am thinking that there's a certain amount of failure. It's basically just not taking credit for economizers. So, you've got this fancy piece of equipment and you're only taking advantage 70 percent of the time, which to me is a reasonable thing because there's enough things that can go wrong with it. So, rather than taking credit for it working 100 percent of the time you only take credit for it working 70 percent of the time and you leave out analysis. So, to me, I'm wondering -- one thing you could do as a sensitivity analysis is you could look at "A" and "B," take "B" with a 30 percent failure rate at economizers.

In other words, figure it out with the buildings and then leave 30 percent of them out, but see what the numbers come up and see whether "A" and

"B" are the same number and then it won't make a difference in the analysis.

MS. WALTNER: This is Meg.

Just to add onto that, you know I'd be comfortable with that approach. I think I would argue for a higher percentage failure rate. The study from last year, a summer study showed failure -- it surveyed different studies on economizer failures and found failure rates from ^^^^ 43 percent was the lowest study they found up to 100 percent failure, which was just looking at four economizers with I think the medium at around 65 percent failure.

So, maybe 50 percent is the right number in there? Jill's shaking her head at me.

MR. WESTPALEN: She says more. She wants to go with 70 percent failure rate.

MR. DELASKI: Do you guys have data? I mean I know you sell the stuff, but do you know how it's installed? I mean they all worked when you sold it, right?

MS. HOOTMAN: By contract too. Yes, I do.

MR. FERNSTROM: So, this is Gary.

Out there in California, the seagulls build their nests in the economizers.

MR. HURST: So, this is John Hurst with Lennox.

Are you saying we should get an environmental benefit for providing safe dwelling and mating locations for seagulls?

(Laughter.)

MR. FERNSTROM: An environmental award for protecting seagulls.

MR. DELASKI: Who models that?

MR. DOPPEL: Kristen Hanameyer did a study, and she's with the Western Cooling whatever -- I forgot what that title is, but I mean maybe her study should be used. That was presented at ACEEE summer study.

MS. COUGHLIN: That's what I was citing.

MR. DOPPEL: Okay. Yes.

MR. CYMBALSKY: This is John from DOE.

Is there another way to look at this from maybe the macro level where you look at time series, commercial electricity from EIA on a monthly basis? If the phenomenon we're trying to describe is that over time economizers are being employed in large numbers, you'd actually be able to see that in the data because I don't think we've seen -- at least there hasn't been a lot of standards set for commercial AC. So, if we don't see that reduction in the load I don't think you can attribute a lot going on with economizers over time.

MR. ROSENQUIST: I don't know if that's what we were after here.

MR. CYMBALSKY: I think now the conversation was focused to whether they're used or they don't work or whatever. So, what I'm trying to get at is there should be some macro level data you may be able to parse out monthly or whatever and look at. I don't know.

MS. COUGHLIN: This is Katie from LBNL.

I just want to mention and remind people that we did take -- within the AEO there are adjustment factors to internal heating and cooling loads on new building stock that incorporate things like code changes as well as things like internal loads that may go up due to more equipment.

And we used those when we take the building loads that are developed from the 1033 building with the 95 building stock and apply those to new buildings. We include this factor.

So, it is possible -- it's very likely that we are already incorporating some affect of -- if economizers have become more prevalent or are operated more effectively that that's already accounted for in the analysis.

There's not a whole lot of discrete data that we could separate out different factors, but I think to the extent that the AEO staff who look at commercial buildings are probably as expert on this as anyone that they would have already incorporated that information.

MR. STARR: You know my thought is it possible to do this analysis first and then we could start discussing it more? If they come out with the same answer -- well, I guess actually we're saying that maybe there should be more economize failure than there is necessary, but if it matches up with the blast simulations from 2003 or '04 that would be one place to get to, and then it would help us have the next discussion.

I mean part of the deal is that -- you know Dick was talking about this last week. I was like why are economizers better. And so he said, well, for instance, they no longer use linkages. They're using gears. I hope that they probably fixed some of the electronics and the sensor malfunctions they typically have.

So, I think there's implications that some of the things that have typically been problems with economizers are starting to get better. So, in the future, maybe those will be better, but the existing one still probably don't work so well.

MR. WHITWELL: We're talking about new installations, right, so with the better economizer design?

MS. COUGHLIN: The blast data don't allow us to do much. We have buildings with economizers in that simulation output and buildings without economizers in that simulation output. There's no way to say what the load would've looked like in a building with an economizer if it didn't have one.

MR. STARR: So, I was thinking doing nothing with the blast stuff. I was just addressing in the post processing of -- well, you put in the economizer afterwards and then assume a certain failure rate and see what that number comes out and see if that matches up with the blast simulations, that's what I was getting at.

MR. ROSENQUIST: On that approach, I mean we were going down that road, right? You know at least the thought I had was that we could take a non-economized building from blast and replace that with this post processing for a functioning economizer, take that and replace an economized building in blast, but when you start looking at the differences in the cooled square footage that indicates to me that, again, economizers are being used in much larger buildings than in non-economized buildings.

So, it presents a problem then trying to do this substitution, right? Again, maybe if we thought about it hard enough and long enough we could figure out a way to get something that would you know start approximating that, but it's not necessarily trivial.

MR. SHOWS: This is Mike Shows with UL.

I assume here, based on this discussion, that if an economizer is shipped with a unit and it fails it's never repaired, right? Because we're talking about failure rates, but we're not talking about repairing, but I'm sure that if the system itself broke it would be repaired. So, I'm just wondering what is the assumption here with the economizers themselves.

MR. ROSENQUIST: Yes. I mean if it's 30 percent failure, right? I mean that 30 percent of them are not operating, so there's no assumptions in the analysis about them getting repaired down the line.

MR. CYMBALSKY: The 30 percent that don't operate could be different each year, so that's another way of looking at it. You could fix some, but then others break. I think that's the assumption.

MS. HOOTMAN: Because that would say that we don't sell any parts for them, and we do, in fact, sell parts for them.

MR. ROSENQUIST: The Kristin Hanameyer paper was that -- you know a lot of mechanics who go to repair it don't even want to repair it.

MR. DOPPEL: Well, there's an association with ventilation here and economizer. And I think that -- I don't know what blast does as far as ventilation, but ventilation for a non-economized building what's that assumption there? And then if there's economized is the same as --

MR. ROSENQUIST: I think it was meeting minimum mass rate 62, ventilation requirements that were in effect at that time.

MS. WALTNER: So, one thing to note about the study is that the failure rates found you know ranged from failing completely shut or open to just an engineer programming the economizer set points you know not optimally. So, there's range of failure rates. So, it might not be fully that the economizer isn't functioning.

But I wanted to understand the Option B a little better based on what you were describing. So, would the post processing -- so is the idea that you would keep the 369 economized buildings and then post process on economizers to some of the no-economizer buildings and add those together, or is the idea that you would -- I thought I'd just heard you say because of the square footage difference in the economizer buildings versus non-economizer buildings you couldn't just sort of scrap.

MR. ROSENQUIST: Again, my thought processing, and again it was under the assumption that there was general discontent about the economized buildings is that you would take the non-economized buildings, convert them into economized buildings, and replace the economized buildings in blast. Now, what you're proposing do --

MS. WALTNER: That wasn't a proposal. I was trying to clarify what you were proposing.

MR. ROSENQUIST: No, no, no, what you're

proposing to do is add those buildings instead to the existing stock of economized buildings as modeled by blast and that certainly can be another option.

And again, I was going down the path that I thought that there was general discontent with how blast was modeling economized buildings and that they weren't worth much so that they would not be you know continued to be analyzed in the analysis.

MS. WALTNER: Okay, but are there -- in the 664 are there large buildings that could be used to replace --

MR. ROSENQUIST: I don't know.

MS. WALTNER: Okay.

MR. ROSENQUIST: I don't know, but I suspect that you know there's far more small buildings in the 664 than ^^^^ you know and far more large buildings in the 369 that are economized.

MR. DOPPEL: Paul Doppel.

I was in a meeting with Dick Lloyd last Thursday and Friday, so I know he wasn't participating in this, but I'd really like to hear what he is --

MR. ROSENQUIST: He was on the Friday call at least the part where we were talking about economizing, and he had things to say about that.

MR. DOPPEL: Yes. Because we did stop at 2:00.

MR. STARR: I have a generalized question about the economizer. So, in the overall energy analysis is this going to make -- my sense is that it would make a difference, but is it going to make a difference, depending on how you model this one way or another or is there going to be a huge effect of the analysis or do you have a sense for that?

MS. COUGHLIN: Again, it's the situation that will affect the base case as well as the standard levels. So, you're going to change the base case estimate of energy consumption. So, if you think of energy savings a percent of what's available at the base case, it could have an effect, but it will not have an effect on the relative position of different yields.

MR. STARR: You have more energy to save. Right.

MR. ROSENQUIST: Right. Because what I'm looking -- well, all we have to look at are these examples that I had done previously, right? And so, in this specific one for Houston there's not much -- I mean .13 out of .163 that's what, 7 percent, 6 or 7 percent reduction in cooling load? The Baltimore example is much larger, 30, 35 percent. Chicago's is very large, right, because this particularly large office building has a lot of cooling load, even down to temperatures beyond zero degrees. So, I guess it just depends and I don't -- you know I think if the building's larger and it's in a northern climate, then perhaps it can have a more significant impact than other buildings.

MR. STARR: So, I just thinking if you were able -- perhaps it's not an easy thing to do. "A" is already done, right?

MR. ROSENQUIST: Right.

MR. STARR: The choice is done, so you don't have to do any work there. "B" requires some work. And so if you were to come and they were to show 3 percent more savings as "A" as opposed to "B" you can just divide it by two and call it one and a half.

I don't know, but you really don't know until you run the numbers necessarily what the difference is, and I assume that's a lot of work.

MR. ROSENQUIST: Yes, it is a lot of work.

MS. COUGHLIN: It may be impossible to create a statistically equivalent sample with Greg's proposal. So, this opens up a lot more problems than it solves. And I think we already have an estimate in the difference in cooling load in economized versus not economized buildings from just what was done with blast.

So, unless someone can look at that and say it's really not credible you know for various reasons, it's not ^^- so this is the magnitude of the cooling impact. Now, the sales numbers we can look at the capacity that's currently in the 1033 associated with economizers and then again this is not the building stock that we're actually working with in the LCC. We've sort of scaled that up to reflect the current building stock.

So, we can go through that exercise and compare to your sales numbers and see if we should maybe adjust the penetration of economizers, and that can be done by reweighting the buildings. But again, we also have that adjustment I mentioned to the cooling loads, which is bringing down the cooling loads over time with new construction. So, we already have some adjustments and we can make an adjustment for the penetration rate of economizers, assuming that these buildings represent reasonably well what an economized building looks like.

So, I think the key technical issue is you have ^^^^ and we can give you more detailed information on a per building basis. If the cooling load reduction in an economized building is reasonable, given your various experience, then we know that we can stick with this.

MR. STARR: Couldn't you -- well, Dick could compare his PNL models with his economized and non-economized and see what that percentage is and compare it to this percentage and then he would feel more comfortable about it, I think. Then he could say, yes, that's sounds good. I think he would be able to do that with the 16 prototypes, although I'm not sure how that would go into the sampling frame and all that business or if he would need to or not, but certainly by the -- these are just by regions aren't they, so you don't really have the building types split out.

MR. ROSENQUIST: For reach region, we could show principal building activity as long as the building sample was high enough.

MS. COUGHLIN: Again, we don't have actual new buildings in the simulation database, so we would have to make so assumptions about what -- you know we have made those assumptions, so we could see if they're any good. So yes, we could take the prototypes with and without economizers and look at, again, the per square foot difference and the cooling load. And we could take our estimates based on this with the scaling factors from AEO and compare those. Yes.

MR. STARR: Probably the guy to talk to -- I mean I'm okay with it, but I'm probably not the one that would have a problem with it. It would probably Dick and his kind of a technical issue.

MR. WHITWELL: This is Bob Whitwell with Carrier.

I wasn't on the call late last week, and I haven't had a chance to catch up with Dick on the outcome of the call and his thoughts on it. I did hear that he said, well, let me think about it. So, I think maybe we need to get together again and just review with Dick and Suzanne and just come to agreement on which path we want to go. And maybe there's some more modeling that needs to be done, but the last that I heard -- so, if you go and you look at the blast results, I mean on the building load curves.

MR. ROSENQUIST: So, like in Chicago or Baltimore.

MR. WHITWELL: I mean the discussion that I've been involved on this you know we look at the blast model and it looks the economizer is not operating there, right?

MR. ROSENQUIST: Well, this particular

building is not economized on the left, so this is using the --

MR. WHITWELL: Okay, but even the ones that we looked at that had the economizer it looked like the economizer was not economizing.

MR. ROSENQUIST: Yes. And I actually looked at a handful of buildings myself and there were some buildings were it looked like it was working and other ones it didn't look like there as an economizer at all.

MR. WHITWELL: Yes, so those are the ones that I saw. Granted, I didn't see all of them, so I think we need to look at something and maybe it's the post processing that you referred to. I think it was "B," right? But I think we need to get the group together again and come to some consensus.

But right now you're saying for Path A is to address this concern that Bob's describing, which is to verify that the economizers are working in some portion of the building. So, that seemed to be what Dick was raising is that he's having trouble seeing where it's working, right? So, if you can verify that economizers are working in the rate of buildings that you show that's what's hard to do.

MS. COUGHLIN: That's what the cooling load per square foot is intended to demonstrate.

MR. WHITWELL: Okay. That's the question back to Dick, and the modelers that you guys work with; are those numbers reasonable?

MR. CYMBALSKY: So, this might be a good spot to ask if we need to form a working group around this. So, I know we might want to form one around the equipment too. It's basically continuing what you guys have already done.

So, I would suggest that because we do have a couple weeks until our next meeting.

MR. ROSENQUIST: I would say that for the May 11 and 12th meetings, again, the objective there is to present life cycle cost results, right, with some modified version of the analysis to take into account all these revisions we've been talking about.

Now, this one on economizing I would say is likely not to occur for that meeting just because of the level of work that would be required to create an economized sample from a non-economized sample, I would say that. I guess following up on what Katie said I mean -- and this could be on us too as well is to try to verify whether economizers reduce cooling load per square foot on some of the basis that we're seeing here. That's another thing that should be checked, right? And Louis was suggesting looking at the 90.1 buildings and seeing if there's a comparable value. I don't know if there is one. I kind of doubt it because it's such a small building set, right, and I don't think that was the mission of that activity was to get after that.

So anyway, for the 11th and 12th, it will probably just using Path A. And I mean certainly we can continue ^^-

MR. CYMBALSKY: You could still continue the dialogue

MR. ROSENQUIST: Continue the discussion to figure out. If that's not satisfactory to a group of the stakeholders, then come up with an alternative down the line.

MR. STARR: The reason I would say

comparing the 90.1 models and what you might find is that the overall impacts to the analysis there may not be that much change or additional energy savings, and so you may not need to do any more work because it doesn't matter. And so that's why I was thinking if there was a quick way to do it you could just see that you know using the blast model you come up with this number and this other one you come up with 10 percent more energy savings.

And you know maybe that could be negotiate, the difference between those two numbers or some version of that seems like that's what I'm saying is it may not make much difference overall. I don't know if that's a quick way to do it or not, looking at those two.

But I can tell you it's not going to be the same because it's going to assume a 30 percent economizer failure rate in the blast models and in the PNL models they assume that they work perfectly, so there'll definitely be a difference.

MR. ROSENQUIST: So, I think you heard from me that for the 11th and 12th I think if the goal is to look at life cycle cost results with a revised analysis we're going to be looking at Path A, at least for the economizers. And then I think concurrently with that doing research, investigation, possible development of some sort of modified building sample would have to be done, so just trying to be realistic.

MR. CYMBALSKY: That's appreciated.

So, we have a half hour. We want to try to get through the rest of what Greg has in his --

MR. ROSENQUIST: Well, I only had one more item here -- well, actually, I forgot about the life cycle costs.

MR. CYMBALSKY: Right. That's another set of slides.

MR. ROSENQUIST: You've heard me talk about this before when Detlef was presenting. I think we're going to go ahead and do this. Detlef can provide revised fan power consumption at elevated static pressures. So, we're analyzing that in the energy use analysis.

So, I mean we have some ways to do that.

We already know that the blast simulations used external statics of .75 and 1.25. So, we could run with those values and have Detlef provide us with those power consumption values and process that in our energy use analysis.

I think without hearing anything else that's probably what we'll do, but looking for any input of whether or not you think that's a good idea?

Again, what we try to do in the energy and life cycle cost analysis is try to reflect field conditions. And what we had done for the NOPR did not take this into account, so I think it's an appropriate thing to do to try to capture reality here.

So, I'm seeing nods. We'll just go ahead and do that.   Okay.

MR. THARP: The question is what static are you going to use at reduced stages? So, if you're operating at 1.25 stat -- 1.25 inches on high stage, what are you going to use for lower stage static?

MR. ROSENQUIST: I'd hope they'd use the fan law, or some version of it, 2.3 or some other exponent that you'd back down.

MR. WESTPHALEN: This is Detlef Westphalen.

We would use the standard 34360 guideline for what to do with what the static pressure is. You know the air flow reduces and then either simplify it by using the cubic or go back to the fan tables and read through the calculation.

(Slide.)

MR. ROSENQUIST: This next slide sort of lays out the proposal for carrying out the revisions and providing the revised results to this group. You know this has been done for other working group meetings, ASRAC working group meetings. So, I think we've identified a lot of the methods that we're going to go ahead and use. And all of them I hope are going to be quantifiable and you'll see the things relative to what they were in the NOPR.

Well, again, for the life cycle cost next time we meet in person, which is on the 11th and 12th, so soon, very soon. You know, again, conducting for sensitivity I think is probably going to be important to this group when we get to issue which no one's agreeing on, right, to try to figure out whether or not that's important issue. So, we'll certainly be doing that as well. And if those sensitivities turn out to be not only just sensitivities, but something that should be primary to the analysis, we'll have that incorporated into the analysis and present results based upon that as the primary set of results.

I wanted to go over revisions planned for the life cycle cost analysis. And again, they've been touched on before during Detlef's presentation. You heard that there are going to be these multiple design paths as a function, whether it's a constant air volume or a staged air volume variable air volume system. And so we're going to capture that because we have this data from CVAC's 2003 that indicates what fraction of buildings are constant air volumes and what are variable air volume, so we have that reflected in the new LCC analysis.

Again, if the main fraction data that's

applied indicates different fractions of CAV and VAV systems, we'll certainly use that to complement the data we get from CVAC. But barring any data like that, we'll rely in the CVAC data to figure out those percentages.

Again, as you've heard too, I mean when we get to a certain efficiency level the existing constant air volume system won't accommodate that, so there'll have to be changes made to controls and to diffusers. And the plan there is to capture those costs into the analysis.

And so again, when you move pass a certain efficiency level where there's not a constant air volume design, we'll be including these types of costs at these higher efficiency levels.

And then, finally, you heard about the conversion curve. Again, written here is that we thought it w as going to be happening at Efficiency Level 3. Whether it happens earlier or later -- I guess that was what the discussion was earlier, but whenever it does happen we plan on adding that cost into the analysis.

MR. STARR: Just a quick question on the design paths there, so are you going to flip that out based on size or tonnage? In other words, the 15 and 30 would be the AV paths or what are you thinking?

MR. ROSENQUIST: Yes, for 7 and 15 there's going to be -- currently, there's going to be two design paths for EL1 and EL2. And we'd allocate the constant air volume design path to constant air volume buildings and the variable air volume path to variable air volume buildings.

And then once we get to that point where that design can only be accomplished with a variable air volume design or staged air volume design, we would start incurring these costs for replacing diffusers and controls.

And now what square footage would be affected is going to be based upon the data that we get out CVAC. Some of the data we were looking at earlier indicated that smaller buildings had a smaller percentage of VAV systems, so that effect could be more significant for the smaller buildings than the 15 tons, but we'll have all those numbers presented by the next time we meet.

Then with the 30 ton I mean one thought that we had -- and again, this is a thought from two weeks ago -- is that the baseline itself would be variable air volume, right? So, there really wouldn't be anything that would have to be done in some sense. I mean anything that would have to be done in the base case would also have to be done in the standard case then, right, if our baseline design itself was variable air volume; but we haven't really talked about the 30-ton systems that much here.

So, I don't know, Detlef, you want to provide any further comment on that?

MR. WESTPHALEN: This is Detlef.

I think the CVAC's data will show that there are some buildings that may, at the 30-ton size level, still be constant air volume. So, I think we should consider some portion, probably a small portion, to be constant air volume. Remember also that the 30 ton is intended to represent 20 to 63, so in the 20 to 30 range perhaps a few more CAV, but properly represented as a 30 ton. The percentages should reflect the full range of capacities in the class. And so, hopefully, the CVAC's data and then the other information that we get will provide some guidance as to how to make those splits, and then we would just have to provide our correlations to the appropriate for CVA and VAV installation.

MR. MAUER: This is Joanna Mauer.

I thought there was some discussion about how staged air volume systems would not require any change in diffusers. Is that consistent with what --

MR. ROSENQUIST: Yes. I mean if you don't go below 60 percent full air flow, then yes, you wouldn't require a change in diffusers specifically. If you go below that, you would. That's our current understanding.

MR. WESTPHALEN: This is Detlef again.

I mean this is a point that may be should be discussed fully because initially we split the path staged air volume and constant air volume for the 7 and 15 in response to the comments received that up through EL1 and EL2 should come in a staged air volume version, but then it's not clear.

You know one would ask why would you even consider putting a constant air volume in when you could put a staged air volume in, depending on whether it achieves better efficiency even at the same IEER, depending on the other aspects of the energy analysis like the ventilation mode; but if you put the ventilation mode at high, it's not going to matter any way. So, I don't know if it matters. Maybe we can take a look at that both ways and see if it does make a difference.

MR. ROSENQUIST: Right. In remembering that input that we received last week, I even thought I heard that maybe even up through EL3 you wouldn't have to make any diffuser change because at that design level you're not going below 60 percent air flow, at least for 15 tons.

MR. WESTPHALEN: 15 ton, that's correct.

MR. ROSENQUIST: So, you wouldn't be seeing this until 3.1 or 4.

MR. STARR: So, I have a question. So, I would say for a unit -- and I was thinking about a constant air volume or one where you'd have a staged one. You might use a BFD. So, typically, with the unit that has two stages or you know two fan speed, the one full speed or then at 66 percent and so that corresponds with low stage cooling and high stage cooling. But then a third place that would be handy to have is the ventilation, and the only way to do that would be probably through the use of a BFD, but you wouldn't have to change your diffusers and do all that. You' just run a lower air flow.

And so, what I'm wondering -- I don't know and the manufacturers do people actually do that because it would seem like a cheaper way to do things than going through and putting in a VAV system in order to run your lower air flow, but I mean if you spend a lot of time in ventilation mode it seems like a pretty handy thing to have.

MS. HOOTMAN: What, the variable speed on?

MR. STARR: The ventilation mode so that you're running at 40 percent instead of 66 percent.

MS. HOOTMAN: (Off mike).

MR. STARR: Well, most of the people that are buying a VFD are definitely hooking to AV boxes for sure, right, is that what you're saying?

MS. HOOTMAN: No.

MR. STARR: Why not the two stage where you have an actual VFD and you're running the hole from 25 to definitely going and hooking up to the AV boxes?

MS. HOOTMAN: So, Jill Hootman from Trane.

I think in answering Louis's comment if you've got a VFD on it you're likely are a VAV, yes. You're not putting a VFD on there. They're too expensive just to run it at constant volume or you know likely. I'm just saying likely.

MR. ROSENQUIST: Again, what we do in the life cycle cost analysis in terms of capturing costs for diffusers, controls, curves, that type of thing is going to be dictated a lot by what the engineering analysis provides to us in terms of what can be accomplished with staged air flow as opposed to fully variable and that type of thing. And also dictating footprint as well is whether or not a conversion curve is required at that efficiency level.

You have to remember -- I mean Detlef just signed up earlier before the break to do EL2.5 and EL3.05 as well, so there's a lot of work here, right, one of the reasons I didn't want to necessarily promise for the 11th and 12th this alternative to the economizer path.

You know these are the parking lot issues that we provide last Friday. There's probably more on the list now, but maybe the thing to do is try to be comprehensive here with the parking lot issues that we want to carry forward. And I can just type them here as we go along.

The first one's still an issue, right?

MR. WESTPHALEN: I think on the first one we concluded that we'll be doing both designs and CBD, depending on information we get exactly how that would split.

MR. ROSENQUIST: I think you heard your proposal on external static pressure and I think we're done with that one, so that's not necessarily a parking lot issue any more.

On the conversion curve, I think everyone's sort of in agreement about the .2 inches.

I think along with what we're doing to address the field external static pressure maybe this is resolved as well. It seems like it could be.

MR. STARR: So, you know with the curve it's really the external and it's the internal, so the total

MR. ROSENQUIST: Right.

MR. STARR: It's the relative magnitude of those two. So, I guess if you do Item 2, then Item 3 is not so much a concern; is that what you're saying.

MR. ROSENQUIST: Yes. Because if we're running at a higher external static pressure, I mean the way we would handle it is just by adding another two-tenths.

MR. STARR: So, then you're comparing apples to apples. Okay.

MR. ROSENQUIST: Right.

MR. STARR: I was suggesting to adjust it down.

MR. ROSENQUIST: Right.

MR. STARR: Okay.

MR. ROSENQUIST: I think you heard what,

at least for the 11th and 12th what we're going to do in terms of economizing. And you know maybe you'll talk to Dick and get further information on his proposal or that he maybe can bring to this group.

MS. HOOTMAN: And we're going to have these by tomorrow or sometime this week you said?

MR. CYMBALSKY: Yes, they're already in the docket now. This packet that was handed today is in the docket.

MS. HOOTMAN: Okay.

MR. STARR: You know what I was going to suggest, talking to Dick, that perhaps we could have a meeting mid-week or something -- well, something on the webinar or something like that, but then if you didn't have a problem with they could start working on it right away rather than waiting until May 11 or maybe May 11 is not that far away.

MR. ROSENQUIST: May 11 is not that far away.

MR. CYMBALSKY: So, the top here is do we want to create a little subgroup to explore this rather than the whole committee.

MR. DOPPEL: Paul Doppel.

So, I was going to ask if there was like a partial step. It's like you either do a whole economizer, one this way or that way, is there a partial step to see what the difference?

MR. ROSENQUIST: I've struggled to try to figure that out. You know some of the ideas, and they're kind of cocky-mammy maybe. I haven't really discussed them with anyone else's is look more closely at the economized buildings and blast. Again, that would take some effort because you're going through over 350 buildings, right, and closely looking -- you almost have to plod every single load versus dry volt temp you know for that building and eyeball it and kind of see if this makes sense. Now, you could probably develop an algorithm to do that check automatically for you. And maybe there's some sort of ground rules that say, hey, this one's okay and if it doesn't do this then it's not okay. And if that's the case apply this post-processing method, right?

Again, I'm talking a little bit off the

top of my head here, but that would be one idea.

MR. DOPPEL: So, we could do a subgroup, as you were suggesting, that would include Dick and then come maybe in the next couple days to reach a conclusion and then how would in that subgroup --

MR. CYMBALSKY: So, you'd report back to the working group here.

MR. DOPPEL: Then you get into that approval, then we would have to meet to approve them to go forward. So, they need the approval to go forward.

MR. CYMBALSKY: Right. So, you know we would set up a webinar of this committee. So, we could set up the subgroup and then I don't know how much time -- I mean these guys have to be honest with how much time you can ^^^^

MS. COUGHLIN: The more subgroups we do the less time we have to actually do work, so I want to make sure everybody's clear that the economizer issue changes the total heat removed in the base case, right? It has no affect on the relative performance of different ELs. So I think -- you know my own sense is any issue that does affect the relative performance of different ELs should have a higher priority for the technical team because that affects the decision criteria. This is something that's going to affect kind of our overall estimate of energy savings and probably -- again, I mean we're looking at something that's probably, at most, 5 to 10 percent.

We don't even know the sign. Because there was no reason to say that we're not overestimating how well economizers perform, right, so I think it's unclear at this point what the priority on the basis of actual impacts on the results is of this issue and it may be again to come back to it in the next meeting. We'll do the best we can to provide a quantitative ranking of the things that have been discussed and see what additional effort we want to put into it.

MR. DOPPEL: Paul Doppel.

So, would you prioritize these that are listed on the board in a different way than this?

MS. COUGHLIN: No, it's at the bottom and that's where it belongs.

MR. DOPPEL: How about the three above it, though? And are you saying that those --

MS. COUGHLIN: Yes, I think that looks reasonable to me. Yes.

MR. DOPPEL: Do we need a decision on those before you --

MS. HOOTMAN: We've already agreed on.

MR. DOPPLE: Okay. Then they're not in the parking lot, are they?

MR. CYMBALSKY: We still need to do the work. Let's be clear we still need to do some work.

MR. ROSENQUIST: Yes, it's not done yet. We just decided that this is how we're going to deal with it.

MR. DOPPLE: What are you doing?

MR. ROSENQUIST: I'm looking for a checkmark.

(Sidetalk.)

MR. ROSENQUIST: Red indicates it's taken care of.

MR. CYMBALSKY: So, can I just maybe

propose that we have enough stuff to work on. And then we get the stuff we've talked about today, and I know that that last issue is still near and dear to some people's hearts. There's some difference of opinion on what difference it will make in the analysis, if at all. Frankly, I'm more concerned with the policy decision that this group is going to try to negotiate. And if my technical people are telling me that they think spending a couple weeks on economizers may not have an impact on that, it'll change the effected sayings for those options.

It's an important thing, but maybe it's not our most important order of business so that we kind of move forward. I'm not saying we won't do some work later on that, obviously, but to just to prioritize the workload let's move forward with what we've identified. We can set up a webinar here and now if we think an interim meeting would be something we should do, or should we just let these guys get to work and come back on May 11th?

Anyone have ideas?

MR. DELASKI: This is Andrew.

I mean they've got a lot of work to do, and we come back on May 11. I wonder a little bit you know are we going to be able to use two full days at that time? We've got two full days booked. I presume if we finish earlier then we'll just finish early.

MR. CYMBALSKY: Right.

MR. DELASKI: A day probably isn't enough.

MR. CYMBALSKY: Right. And I think that's where get people home earlier on earlier flights. Yes, I think you can count on that.

MR. DELASKI: There might be other issues. We didn't go through to see if there are other parking issues here. I'm not sure we want to at this late hour. I assume you guys have pretty complete notes.

The one issue that I think is a pretty significant issue out there, I wished we'd left some ambiguity, is at what point do you apply the conversion curve costs? We had some discussion around that you know and how does that applied? That's a pretty big adder. You know someone said it amounted to a thousand dollars. And when that kicks in that's really going to affect the curve, potentially, so that's one area where I don't know that we've resolved that issue today.

You guys are going to do your analysis and come back to us. That's an important issue.

MR. ROSENQUIST: That particular one because it's an installation cost -- it's an input the LCC model. It's an easy one to handle, very easy to handle a sensitivity. We can maybe handle it in real time, right, at the next set of meetings.

I mean if Detlef comes back and says, okay, this is the point at which a conversion curve is needed according to the data I'm looking at and other people feel, wait a minute, it should be earlier or later, you know that's something we can on the spot I just think make that modification and see what the result and impact is.

MR. STARR: I was also thinking, though, for the conversion curve the sheet metal guys should be pretty good ones to talk to about pricing because they make those as well, and also pressure drops too.

I mean they're not here any more, but they would be seems like good people to talk about that as well.

MR. ROSENQUIST: Anything else cross your mind, Andrew, about the parking lot issues?

MR. DELASKI: Well, we had the legal issues, but I put those back. I think that's outside the scope of the folks in Eric's -- I don't know. There are other things that folks in our caucus, maybe not parking lot, but ambiguous on some level.

And Jill, on the costs you talked about -- is HRI collecting the economizer sales?

MS. HOOTMAN: Shipments, yes.

MR. DELASKI: Shipments I meant to say, yeah.

MS. HOOTMAN: (Off mike.)

MR. DELASKI: So that would come in with the data? That's all I have.

MS. HOOTMAN: (Off mike.)

MR. CYMBALSKY: That's a good question. When we were discussing the meeting, and I read through this I said, hey, you know what, it doesn't say anything about Mike didn't even show up to the meeting, so that's an interesting development there. No.

(Laughter.)

MS. HOOTMAN: (Off mike.)

MR. CYMBALSKY: No one's really focused on that really. From what I understand there was the one issue that was brought up at the public meeting. Yes. And so you know I haven't sifted through anything, other than we heard that issue. I don't know what you all discussed. It sounds like you focused more on the ruling side.

You know certainly if that point is the only point then I'm just going to simplify it as quickly that should it be 82? Should it be 81? You know that to me that's negotiation.

MR. DELASKI: Well, there were some technical issues that were raised by the manufacturers as to having to do with when are you incurring the costs for condensing and condensing material changes that aren't incorporated in the analysis, so I don't know when the time is for that to be -- for you guys to lay that out for the committee consideration.

Now, whether we have time next time or -- I kind of agree that there's a lot of -- air conditioner we don't' want to detract from this important analysis, but I would like if we could give an hour to look at the issue.

MR. CYMBALSKY: Well, we should set aside a time on the agenda for next time. Actually, we got through more than I thought we would today.

MR. DELASKI: Do it right now. That's a joke.

MR. CYMBALSKY: I know you were joking. You notice how I didn't laugh.

(Laughter.)

MR. CYMBALSKY: The worst joke you've ever told me.

MR. FERNSTROM: This is Gary.

I was talking to Steven Rosenstock this morning of EEI and he wants to make sure that you all seize the equal opportunity for improvement that electricity does.

MR. DELASKI: Condensing levels Steve

wants.

MR. CYMBALSKY: We'll draw up an agenda for the May 11 and 12th, and make sure we put a few hours down for that. We're not overlooking it at all.

MR. DELASKI: John, when do you think we'll see that agenda? I want to make sure we've got the right people lined up at least on the phone.

MR. CYMBALSKY: Yes. So, let's give these guys some time to do some work and we'll be able to more fully understand where we are with some numbers, but yes, we'll pass it out at least several days before the meeting.

You'll be happy to know I put this agenda together last night at 4:30. And Eileen got me her slides at 4:45. And I still made it to the hockey game and dinner beforehand by 5:45, so we made it.

(Sidetalk.)

MS. HOFFMAN: The Capitals. They're doing very well.

MR. CYMBALSKY: Okay, then the other thing is the facilitators are going to put together the ground rules and those types of files, process-type files. We'll put them out there. We have the share point. We'll get that set up and we'll communicate all this to the members and the alternates. I've already gotten a few emails. Thank you for those who've submitted those.

And then I guess just to finish up today we usually reserve public comment time, but you know I'm looking around and the public already went public on us, but thank you for everyone. I think today went very well. I think it bodes well for us making our deadlines. It's going to be a lot of work, but I think today --

MS. HOOTMAN: (Off mike.)

MR. CYMBALSKY: The subgroups I think we've decided we're going to do our work now and tackle on May 11.

MS. HOOTMAN: Okay. We'll look forward to seeing you on May 10 and 11th. And if there's a webinar in between, we'll get back to you. And it's been a pleasure. Thank you.

MR. CYMBALSKY: May 11 and 12th.

(Whereupon, the meeting concluded at 5:00 p.m.)

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