UNITED STATES DEPARTMENT OF ENERGY

PUBLIC MEETING ON ENERGY CONSERVATION STANDARDS FOR RESIDENTIAL CLOTHES DRYERS AND ROOM AIR CONDITIONERS

Holiday Inn Capitol
550 C Street, Southwest
Washington, D.C. 20024

Wednesday, October 24, 2007
9:00 a.m.

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A G E N D A

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P R O C E E D I N G S

9:00 a.m.

Opening Remarks, Introductions, and Agenda Review

Doug Brookman

MR. BROOKMAN: Okay. So let's start, if we may, please. Good morning, everybody, and welcome. This is the U.S. Department of Energy's Public Meeting on Energy Conservation Standards for Residential Clothes Dryers and Room Air Conditioners. Today is October 24th, 2007. My name is Doug Brookman. I'll be facilitating this meeting today for Public Solutions in Baltimore.

It's our tradition to start off these meetings by providing an opportunity for everybody to introduce him- or herself and so I thought I'd like to do that right here at the outset. And, maybe start right over here to my left. Your name and organizational affiliation. We'll just go around the room.

(Introductions)

MR. BROOKMAN: Thank you. Thanks very much. So then, let's push -- who's handling the slides?

(Pause)

MR. BROOKMAN: I would ask for your consideration today in the conduct of this meeting.

Please listen as an ally. Please try and keep your comments short and to the point. I'm going to ask that any sidebar conversations that need to happen today, if they're going to last more than about 20 seconds, please take them out of the room.

We're going to be focusing on the issues and try to keep this on track and on time today. Please speak one at a time and say your name for the record each time you speak. I'm going to ask also that you set your cell phones and your electronic devices on vibrate so that you don't interrupt the proceedings today.

As we get on towards lunch we can talk about lunch-keeping options, but I'm going to do an agenda review right now.

I am now concluding the first substantive element you see. I think all of you received a packet when you registered this morning. In the packet is an agenda and also a thick packet of PowerPoint slides and also the actual Federal Register document. They're all included there.

Following this agenda review, the Department wants to provide an opportunity for individuals to make briefing opening remarks about key issues from your perspective. So we'll do that. And then from there

we'll be going to a rulemaking and analytical methodology overview by Stephen Witkowski. Following that, a market and technology assessment overview. We'll take a break midmorning, round about 10:30 or so. Following that, we will return and do a screening analysis and engineering analysis.

Just prior to lunch, preliminary manufacturer impact analysis. We'll break for lunch round about noon or so. And when we return at one, we'll be doing markups for equipment price determination, energy use determination, and life-cycle cost and payback period analysis. Moving on from there, shipments analysis, national impact analysis, LCC subgroup analysis.

We'll take a break mid-afternoon. Move on from there to manufacturer impact analysis and then utility impact analysis, employment impact analysis, environmental assessment and regulatory impact analysis. That's a whole lot of analysis. This is called the framework meeting because it gives those of you that are not familiar with this rulemaking process a complete overview of all the many steps that will be taken in the process.

At the end of the day, round about 3:45, 4 o'clock or so, there's another opportunity for anybody that wishes to comment and raise any additional issues

that you might wish to raise at this opening meeting. We'll also have closing remarks.

We do intend to adjourn today round about 4:30 or so. If we get through it faster than that, we'll seize that opportunity.

Okay. So that's all I had to say here at the outset. Questions and comments here before we move into the subject matter of the day?

(No response)

MR. BROOKMAN: Okay. I see none. I would ask --

MR. LEWIS: I just want to welcome everybody.

MR. BROOKMAN: Ron Lewis.

Remarks by Ron Lewis

MR. LEWIS: I want to welcome everybody for making the trip in here. I understand the highways are considerably congested this morning. I hope that for many of you driving into the meeting this morning, evidently the first time in months of getting rain, that it's really upset some of the drivers. So, appreciate you putting up with the hassle factor.

Just of interest. How many of you were here on November 15th, 2005, when we addressed all the issues that the Appliance Standards Program had to confront and accomplish?

(Show of hands)

MR. LEWIS: That was what we called, I think, a schedule-setting meeting. At that time we took an inventory because we were being highly criticized that we were pretty slow getting things out. We had statutes on the books that we were required to accomplish. We had new legislation that was in our face, and there were a lot of rightful concerns, people that said we need to get about life and get this over with.

And so at that meeting, the few of you that were at that meeting, it was a well-attended meeting and we thrashed through a lot of items. We put together -- that was the starting point and that was the organization of some 115 items that I took an inventory of that we put together into the report to Congress that is on our website, on the Appliance Standards website, which is basically our operating plan at this point.

So if you want to know the things that are coming up, it's on our website in that report to Congress. There is a separate schedule on the website without even opening the report to Congress.

We have other things that have been interjected into that. We have a few things that have

been accelerated. But by and large, that is our schedule.

This is one of the many, many, many activities that's on that schedule. We've been having a lot of these meetings lately. I was surprised that Doug had to look at the agenda to talk about the things that we're going to do, the sequence, because it's the same sequence that we used to try to have a methodology that's familiar and give you the courtesy of not making you adapt to different approaches to every single thing that we do.

So again, I want to welcome you for being here. We're looking for a good dialogue and hearing what's on your mind. We're presenting what we're starting out with, our starting point, our approach, our thoughts as we kick off this rulemaking process. And if there's something -- we'd like to hear things up front. We'd like to have issues up front so we've got time to consider them and work with you on those. So please feel free to tell us what's on your mind. Thank you very much.

MR. BROOKMAN: Thank you, Ron. This now is an opportunity for anybody who wishes to do so to make brief opening statements about the issues that matter most to you. I'll start with Dave Calabrese.

You will note that you need to push the button on your microphone in order for it to be -- this is a court-reported session today. There will be a full transcript of this meeting. So please help us by both saying your name and getting yourself close to the microphone.

Comments from Participants

Dave Calabrese, Association of Home Appliance Manufacturers

MR. CALABRESE: Dave Calabrese with AHAM. Thank you for the opportunity today. We look forward to presenting comments.

On the whole, for the appliance manufacturing industry, we think that the approach that the Department is taking is correct in many respects. There are some significant issues that we will be commenting on today, starting with test procedures, which I think is maybe first up. There are some significant issues there in regards to the clothes dryers, some in regard to room air conditioners that we will be commenting upon.

Overall, when DOE looks at product classes, efficiency bins and gap fill levels, we have some issues there, some comments we wish to make to either clarify or add categories that we think will make their

-- your analysis more robust and will be able to more effectively, we think, determine what are the products out there in the marketplace right now.

I think as an overall comment, and this is something that we will be reiterating throughout the process, for instance, for clothes dryers, we believe that the data will show that there really are not many great opportunities at this time to increase the efficiency of these products.

As the Department knows, there was a clothes washer rulemaking a number of years ago that resulted in clothes washers becoming of course much more efficient but the end result being clothes being actually dryer as they come out of a clothes washer. That of course has an effect on how dryers operate and the energy used to dry clothes. So we think that that will be a factor that the Department will need to consider, and I think that the Department understands that clearly.

Room air conditioners as well. These are products that there is quite a bit of change in how they're produced over the years. They're primarily produced outside the United States. In some respects they become commodity products. So we'll be commenting and providing -- helping with data collection to show

where the industry is at this time.

But overall, we appreciate this opportunity and look forward to the discussion.

MR. BROOKMAN: Other brief comments here at the outset?

(No response)

MR. BROOKMAN: No additional comments at this time. So then let's proceed, then, with the slide packet. I think all of you have a copy of what's going to be presented up on the screen here. Stephen Witkowski.

Rulemaking and Analytical Methodology Overview

Stephen Witkowski

(PowerPoint presentation)

MR. WITKOWSKI: My name is Stephen Witkowski with the Department of Energy. I want to welcome you --

MR. BROOKMAN: Turn your microphone on.

MR. LEWIS: Is that turned on, Steve? Either you have to adjust it or turn it on.

MR. WITKOWSKI: Is that better?

MR. LEWIS: Yes.

MR. WITKOWSKI: Okay. Thank you.

My name is Stephen Witkowski with the Department of Energy. I want to welcome you all here

today again. The purpose of my brief discussion is just to go over the framework document public meeting procedures and the rulemaking procedure. I'm not going to go into all the bloody detail that's in the slides. I think most of you are aware of it. But as you know, it's not a simple process.

This meeting, being the first step, is an opportunity to present the procedural and analytical approaches to evaluate energy conservation standards in certain products, clothes dryers and air conditioners.

As has been stated before, this is an informal meeting. Please feel free to make comments. The Department is looking forward to all of your input. We want to provide a forum for public discussion on rulemaking issues and we definitely encourage stakeholders to submit data, information, and written comments.

In terms of submitting comments, again all of the information is provided in your packet here. It's also been provided in the notice of public meeting that was posted in the Federal Register.

Here's the actual information again on providing feedback. I won't go through this. It's all there. If you need to get in touch with any of us, you have our telephone numbers. Please feel free to call

me or anyone else on the team.

Background. I think you're all pretty much familiar with the background, but the rulemaking procedures have their source in the various legislation, the Energy Policy Conservation Act, the EPCA of '75, and various amendments, and the establishment of prescriptive energy conservation standards for these dryers, performance energy conservations for room air conditioners, and so on. DOE is directed to conduct two cycles of rulemakings for both products to determine if more stringent standards are justified.

Previous rulemakings. Again, the history is all here. You have final rules in 1991. We have second standards that were initiated for publication in 1994. Again in 1998 more work was done on clothes dryers, and then the time frame for room air conditioners is also here. You don't need the details.

The current rulemaking for residential clothes dryers and room air conditioners. This chart basically shows the process. As you know, there was the schedule that -- the schedule-setting process that Ron Lewis mentioned before that started in -- it took place in 2006. The framework document which was recently published and which you should all have a copy

of or have access to. From there we go to the advance notice of proposed rulemaking, or the ANOPR. Then on to the NOPR, the notice of proposed rulemaking. And we hopefully end up with a final rule. There may be other finer steps that take in place in there based on comment, test procedures, and so on and so forth.

Again, I'm not going to read all of the history. It's all pretty straightforward here. But this is the basic time frame.

Now, test procedures, which I'm sure many of you will have comments on, we'll be discussing in more detail later. For residential clothes dryers, the first final rules for the dryer test procedures were published in May of 1981. Manufacturers informed DOE that the test procedure is unable to test vent-less dryers, and that's an issue that I'm sure will come up today and will be discussed.

DOE proposed an alternative test procedure in 2006 for vent-less dryers. Final determination on alternative test procedures has not yet been made. DOE seeks comment on amending the clothes dryer test procedure to adequately measure the effects of remaining moisture content, or RMC, average number of use cycles, and automatic cycle termination.

For room air conditioners, again here's the

time frame, starting with June of 1979. ANSI national standards -- ANSI National Standards Institute, or ANSI -- and ASHRAE are the test procedures that have been updated to more recent versions which could be incorporated into DOE test procedures by reference.

Both test standards have been updated. DOE also seeks comments on amending the room air conditioner test procedure to adequately measure effects of technologies that improve part-load performance and annual operational hours.

And again, we have requests for comments. While you have the information as to how to get comments to us, we do emphasize that we look forward to these comments.

MR. BROOKMAN: Thank you. For those of you that are new to these proceedings, this is how the Department cues you to provide comments in a systematic sort of a way. You can see both Item 1-1 and 1-2 on the screen provides an opportunity for you to comment on the test procedure issues that Stephen referred to.

Dave Calabrese.

MR. CALABRESE: Dave Calabrese with AHAM. I'll start off with dryers. We agree the Department is properly looking at changes to the test procedures. Identified in my opening comments, this -- the products

have changed over the years and most particularly because of the changes to the way -- to clothes washers and to the change to the test procedure there. An issue that needs to be addressed is this one of remaining moisture content, RMC.

I think the Department has identified changing that level to around 56 percent or so. From the industry standpoint, we agree that it certainly should come down. We think 56 is probably a good number. We'd like to look at this some more and get back to you with more specifics, whether -- where we think it should be. But at this point I think that number is a fair representation of remaining moisture content for dryers, but we'd like to get back to you with additional input.

You also talked about -- asked about the cycle times, or use -- numbers of cycles and cycle termination. These are also issues where we agree there should be changes to the test procedure. I might actually defer to Debra Brunk, our expert on this, in a moment.

But yes, we agree that those changes should be done, and most particularly the issue of vent-less dryers. The current test procedure, as DOE acknowledges does not address vent-less dryers and as

we understand it, it's not a simple matter of on the current procedure just simply perhaps closing a vent off, that it would be -- require some more significant change or addendum or something or else to the test procedure to appropriately measure the energy use of vent-less dryers. So we would commit to work on developing something that we could present to the Department that you could use to measure that energy use.

I can turn to Debra, if you have some comments.

MS. BRUNK: It's your turn.

MR. CALABRESE: Okay. So --

MR. BROOKMAN: Useful comments on clothes dryers.

MR. CALABRESE: And on room air conditioners --

MR. BROOKMAN: Let's --

MR. CALABRESE: Okay. Let's -- okay.

MR. BROOKMAN: Any additional comments from other people on clothes dryers? Harvey Sachs.

MR. SACHS: Harvey Sachs, American Council for an Energy Efficient Economy, subsequently to be referred to as ACEEE. We support changes in the test procedure that will reflect the best possible field and

other performance data and make the tests as relevant as possible to the generations of clothes dryers that we're starting to see.

We are concerned that the devil is in the details. We would be concerned about changes being used to drag out the process of moving to implementation of a new standard. But we certainly look forward to working with all parties to get this right. Thank you.

MR. CALABRESE: I'd like to ask a question, perhaps. How does the Department intend on proceeding in that there need to be changes to the test procedure at the same time you need to collect data to, as Harvey says, to keep the process going. Does this all happen concurrently? Does it happen -- best case, it happens where the test procedure change is done first. But I don't know if you have any comments on that.

MR. BROOKMAN: Ron Lewis.

MR. LEWIS: It's happening concurrently because, as you're more than well aware, in trying to collect data and get the input that we need to make the right decisions, the requests are going out. That's part of the purpose of this meeting. And what's necessary for both test procedures and the standard, we're collecting information having dialogue with

stakeholders that all that is being assembled into the degree of complexity and issues. We are trying to hold to having test procedures finalized before the NOPR is finalized, or the standard.

So we get started on it to collect the data, look at it. They will be running concurrently, and we try to bring closure to the test procedure before we're in the final rule stage of the standard.

MR. BROOKMAN: Okay. Thank you. Yes. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Just a quick follow-up. It sounded like the test procedure might not be ready before the ANOPR stage. Won't that kind of cause a lot of possible confusion because the ANOPR might be based on the previous test procedure where the NOPR might be based on a new test procedure?

MR. BROOKMAN: Ron Lewis.

MR. LEWIS: We certainly would like to be through quickly with that. The reason for this meeting is to raise issues. If we've got things that are easy to resolve, you know, we will post haste try to do that. But we -- our commitment is to try to get test procedures done before the completion of the NOPR, before the publication of the NOPR.

So it's a balance. We're hopeful that we'll

get quick input and get all the issues on the table quickly and be able to resolve those. But if not, our tradition, our process, our methodology is trying to have it completed by the end of the NOPR, so.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: Dave Calabrese. We would commit from AHAM's standpoint to try to provide our input to this change as soon as possible. I can't give you a specific time, but I would anticipate it could be done within a period of months, or perhaps shorter. So if that would help to keep this process moving.

MR. BROOKMAN: Mike Rivest. It's not on. Come to the table and hit the -- Michael. Mike. Come forward and sit there.

MR. RIVEST: Mike Rivest, Navigant Consulting. Our goal would be to have a proposed rule for the test procedure by the ANOPR for the rulemaking so that, you know, things are in sync. Then we would have the final rule for the test procedure with the NOPR for the rulemaking.

MR. BROOKMAN: Okay. Thank you. Thanks very much, Mike. He just said the goal is to have the test procedure ready before the ANOPR.

MR. RIVEST: Excuse me. The proposed. And I was talking about finalizing the test procedure. So

we're talking two different stages here. They're both the same thing. So we would be much like this, throwing out our thoughts, et cetera, on the test procedure, handling it, but the finalization of the test procedure we would have done before the final rule is started.

MR. BROOKMAN: Thank you for clarifying that. We have people in the back of the room who are having a hard time, so I'm going to be tweaking the sound system here a little bit as we go along. So keep flagging us if you can't hear what's going on back there.

Okay. So, any additional and perhaps final comments on residential clothes dryer test procedures as we move towards test procedure issues related to room air conditioners? Yes, Harvey Sachs. In the microphone.

MR. SACHS: Just an administrative question. This is Harvey Sachs. Would this be an appropriate time just to introduce a number of people who have come into the room since our first round?

MR. BROOKMAN: We'll do that in a little bit.

MR. SACHS: Thank you.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: Dave Calabrese with AHAM. In

regards to the test procedure for room air conditioners, there are really two issues I understand that the Department was asking for questions or asking for comment, which we are commenting. That would be on the part-load performance being -- that concept being applied to the test procedure, as well as considering changing the energy rating from an EER to a SEER.

On part-load performance, our view is that that is not applicable to room air conditioners because of the nature in which they operate. They are essentially an on or off product. Either they're on and they're running or they're off. And because of the fact these are becoming today, as I mentioned before, commodity products, very inexpensive, the part-load performance -- the devices used for that are rather expensive and aren't necessarily -- aren't appropriate for that type of product.

As well, the -- moving from an EER to a SEER rating -- our friends with the ARI are not here. I don't know as much about the SEER rating. However, as we understand it, that is, again, not appropriate for room air conditioners because of the way they function. I would actually defer to someone who is more familiar with that, but from our input, it is not an appropriate change to the test procedure or an appropriate change

to the standard.

MR. BROOKMAN: Thank you. Harvey Sachs.

MR. SACHS: Harvey Sachs, ACEEE. I agree with Mr. Calabrese on this issue, in particular because room air conditioners can have an impact on utility peak demand and service issues. We do not believe that moving to a SEER type seasonal estimate for room air conditioners would be helpful to the country or even to providers as we see large segments of the country considering time of day or peak pricing for residential consumers.

MR. BROOKMAN: Thank you. Yes, David Goldstein.

MR. GOLDSTEIN: I'm David Goldstein, NRDC. I also want to basically agree with the AHAM position, with a bit of a variant. The most important criterion for room air conditioner performance is peak efficiency, which is EER. If there's going to be a standard based on one parameter, that should be the one that you do for the DOE standard.

You might want to consider a second standard that includes part-load performance and set requirements on both. You'll recall that we recommended that the Department do this for central air conditioners and the Department agreed that they were

authorized legally to do that but chose not to.

So again, we would prefer to see standards that include part-load and full-load. So that would entail developing a test procedure for part-load. But the part-load performance is less important of a parameter both because of peak load and because, looking at the SEER test procedure for central air conditioners, it's hard to get it right. The test procedure for SEER for central air conditioners diverges considerably from the real-world performance, and so it's just an inherently tougher procedure to do.

MR. BROOKMAN: Additional comments on test procedure issues related to room air conditioners? Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. To reiterate, I would say that most of the utilities would still like to see the EER rating, especially if they're doing incentive programs. It does help with a lot of their calculations in terms of peak demand reductions for summer programs. Thank you.

MR. BROOKMAN: Thank you. So, is that it for test procedure issues? Okay. Steve.

MR. WITKOWSKI: Then, some more history and some diagrams, schematics on the energy conservation standards.

MR. LEWIS: Steve, you need to speak into the microphone.

MR. WITKOWSKI: I'm sorry. I will now move on to some more history and some schematics of the procedures itself for setting standards.

Based on the public laws mentioned here, they direct DOE to take into consideration seven factors when setting energy conservation standards for residential clothes dryers and room air conditioners. I'm sure most of you are familiar with these, but the EPCA factors, number one, is the economic impact on consumers and manufacturers, lifetime operating cost savings compared to increased cost for the product, total projected energy savings, impact on utility or performance, impact of any lessening of competition, need for national energy conservation, and other factors that the Secretary of Energy considers relevant.

And for the corresponding factors, the DOE analysis is essentially for, number one, life-cycle cost analysis, manufacturer impact analysis, life-cycle cost analysis, national impact analysis. And again, I apologize for repetition, but this is the process. Number four is engineering analysis and screening analysis. Five, again, manufacturer impact analysis.

Six, the national impact analysis, and then for the Secretary, environmental assessment, utility impact analysis, and employment impact analysis.

Here is a diagram showing the time frame of the stages for energy conservation standard -- for the energy conservation standard rulemaking process, our milestones. Again, as I mentioned before, starting with the 2006 schedule-setting. This meeting based on the framework document that you've all seen. Next will come the ANOPR and the ANOPR public meeting. Then the NOPR publication, the NOPR public meeting, and finally, at the end or near the end of 2010, final rule published, and then the applicable standards at the end of 2013.

The relevant points for stakeholder participation are shown on this slide, also.

For the framework document, here we are today. We have the document and it was published in the Federal Register, as you're aware. Again, we encourage interested parties to submit comments. The rest of it we've already talked about on the framework document. I'm not going to go into all the details.

Here are the steps in the standards for rulemaking at the ANOPR stage, which is the next stage after this one. And again, we have market and

technology, screening analysis, engineering analysis, markups for equipment price determination, below the engineering analysis the preliminary manufacturer impact analysis, and so on. And then down to the national impact analysis. I think you're all capable of following the schematic.

Here is my favorite slide, or one of my favorites, because it shows how simple the rulemaking process is. Because it's so simple, I won't go into the details.

Again, the purpose of the public meeting today is to present methodologies for the ANOPR analysis -- excuse me. The purpose of the ANOPR public meeting, which will be the next stage, is to present methodologies for ANOPR analysis and characterize results, to discuss specific issues related to the ANOPR analysis, to seek input from attendees on methodologies, assumptions, and data sources, and to describe upcoming analyses and next steps and seek future -- excuse me, seek further input.

And then again, here is a similar schematic for the NOPR stage. I'm sure you can all follow this as we move on down toward a final rule.

And here's another one of these in-depth slides that, again, I'm not going to go into. I think

you've all seen them, showing how simple the process is.

And then the purpose of the NOPR public meeting is to hear the views of stakeholders on DOE's proposed standard levels, to obtain input on any remaining issues relating to the notice of proposed rulemaking. DOE will consider all verbal and written input in preparing its final rule.

And then a schematic for the analysis for the final rule, which will end up in the result being the final rule.

And that is pretty much the breakdown of the process. Any questions on that?

(No response)

MR. WITKOWSKI: Thank you.

MR. BROOKMAN: So the next item on the agenda is to take up the market and technology assessment. Before we go to that, any other comments or questions related to the overview that was just provided?

(No response)

MR. BROOKMAN: I see none. Okay. So then, Judy Reich, market and technology assessment.

Yes?

MR. LEWIS: Before you move on.

MR. BROOKMAN: Yes.

MR. LEWIS: -- asked if you could introduce people in the meeting. This would probably a good break time here.

MR. BROOKMAN: Okay. So let's provide an opportunity for anybody that has not yet had a chance to introduce him- or herself to do so now. We'll start with you, David.

(Introductions)

MR. BROOKMAN: Okay. Thanks. Thank you. Judy.

Market and Technology Assessment

Judith Reich

(PowerPoint presentation)

MS. REICH: Thanks, Doug. This is Judy Reich from Navigant Consulting, and I will be kicking off the discussion of the ANOPR analyses. Let me just begin by saying I recognize that most of you probably have been through this process before and are very familiar with some of the topics I'm going to be describing. But I want to go through it in some detail because there are going to be some discussion of the decision-making processes and the results, the key results, of those decisions that will be very important to follow through to see where we wind up with the energy conservation standards.

So as you'll see at various points, as we've been doing already, there are opportunities to provide comment on topics that we've identified, but please feel free if there are other issues that you'd like to bring up to do so at that time.

I'm going to be starting off by talking about the three upstream analyses. I'm going to go through the market and technology assessment, the screening analysis, and the engineering analysis, and those three together will culminate in the definition of the cost efficiency relationships for each of the products in this rulemaking.

Since we have both the room air conditioners and the clothes dryers covered today, I'm going to go through each analysis for both products before I move on.

At the beginning, we start off with our market and technology assessment. This is our starting point where we define the products that are covered and the technologies that are available to improve energy efficiency. This is our launching point for the ANOPR analysis.

In the market assessment what we do is we look at the existing state of the industry. It's a snapshot of the room air conditioner and clothes dryer

industries. We look at historical trends leading up to the point we are at. We look at, for example, historical data for product shipments for the values of those product shipments. We look at trends in retail prices. We look at market saturation, how many consumers are using these products.

We also look at trends outside of the industry itself but that affect manufacturers. For example, we'll look at housing starts to see where opportunities are for changes in product shipments.

Also as part of the market analysis we look at the market shares of manufacturers for both room air conditioners and dryers with the idea that we want to understand the competitive landscape, and again, that will be our starting point for later on where we determine in our manufacturer impact analysis how that landscape could be affected by different energy conservation levels.

In the technology assessment, we look at the entire universe of technologies that are available that can positively impact energy efficiency. At this point we want to cast a very wide net. We want to look at things that are perhaps in the research stage as well as those that have been implemented in prototypes or that are currently available on the market. So we want

to understand everything that's out there.

We also look at databases of product information to understand the distributions of energy efficiency among models that are already on the market.

In addition to -- this is really part of the market assessment. We also look at where -- what the existing regulations are for the products. We look at the federal and state level regulations and we also take a look at voluntary labeling and certification programs, Energy Star for example, so that we understand what incentives are available right now for products to have their efficiency at higher levels.

The outputs of the marketing and technology assessment are in two areas. I'll discuss in a moment product classes. That's a very important category because we -- that will set the starting point for how we group the products together according to their function and according to the means that are available to improve their efficiency. Each one of those product classes will wind up going through its own analysis and eventually with the potential for its unique energy conservation standard.

The second output would be the technology options that we've identified, which right now will be very broadly identified but in the screening analysis

will be narrowed down by a very specific set of criteria to just those that are going to propagate through to the engineering analysis. At that point we designate those as design options.

MR. WITKOWSKI: Steve Witkowski. You might just want to point out the difference in this slide. We didn't get a chance to correct this page.

MS. REICH: Oh, okay. The page that you have in your handout apparently is different. In the handout we also had incorrectly identified that the baseline definitions would be coming out of the market and technology assessment, but in fact that happens later on in the engineering analysis.

MR. BROOKMAN: Thank you. So this is the point at which DOE welcomes your input on information that would contribute to market assessment for both residential clothes dryers and room air conditioners. If there are any comments now.

MR. CALABRESE: Dave Calabrese with AHAM. Well, I guess the question is there is going to be discussion on product classes and the like coming up. So we have comments on those issues. I would reserve that for that point. I don't know what additional comments the Department is looking for at this point.

MR. BROOKMAN: Is there anything specific --

MR. LEWIS: No, not at this time.

MR. BROOKMAN: Yes. Harvey Sachs, please.

MR. SACHS: Harvey Sachs, ACEEE. Two comments, or a comment and a question. One, heat pump dryers are now on the market, particularly in Switzerland, and we feel this would be an approximate max tech to be included in the engineering analysis.

The question, which I address to the Department today, even to the manufacturers, is we've talked about the remaining moisture content as input to the clothes dryer. Are there points in the present tense method where there is the possibility for ambiguity or less than optimum results in terms of cycle termination when the clothes are defined to be dry? If so, we think this ought to be thought about. Thank you.

MR. BROOKMAN: Additional comments at this point?

(No response)

MR. BROOKMAN: Okay.

MS. REICH: Well, let me begin at this point by discussing the definitions of which are covered products for this rulemaking. EPCA has provided definitions for both clothes dryers and room air conditioners.

For clothes dryers, these are units that are both electric and gas. I want to point out in this definition that both of them describe a tumble action for the drying process. So for example, cabinet dryers would not be covered under this rulemaking.

For room air conditioners, we're looking at refrigeration-based products, specifically other than PTACs. They are also defined as having the possibility of including a reverse cycle so that they could be operated for both heating and cooling.

MR. BROOKMAN: Yes. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I guess a follow-up on what Harvey was saying. In terms of the definition of the electric clothes dryer, I remember some EPRI studies of microwave clothes drying. I don't believe they had a tumble-type drum. I'm not sure about the heat pump clothes dryers that Harvey was referring to.

I'm wondering if the definition may or may not need to be expanded to cover some of the new technologies. Again, I'm not sure, you know, again, what the market share is, but just in case for whatever reason they don't have a tumble-type drum for whatever reason that would -- would a new tech like Harvey was describing be covered under this standard. Again, it's

something to think about in the definition.

MS. REICH: Right. And as you'll see, microwave drying is a technology that we're considering. At this point we are not -- we're going to rule without.

MR. ROSENSTOCK: Right. Okay. Steve Rosenstock. But under the definition, if it didn't have a tumble-type drum would it still be part of the program?

MS. REICH: You know, that's something that would have to be looked at because currently the definition does exist for the tumbling action.

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: David Goldstein, NRDC. I want to add my voice to the previous ones about expanding the definition. Whether or not according to the current legal definition you can do that doesn't matter because DOE has the authority to regulate additional products. So if you had to do a two-step process of defining a different type of dryer as a new product and then analyzing it in the same box as everything else, you could certainly do that legally.

We wouldn't want to create either loopholes or foreclose the opportunity that the test procedure could cover completely different technologies of dryer

that are more efficient and without them the manufacturers wouldn't be able to certify that this new product is that much better than the existing product. So it's going to affect not only the standards analysis you're doing but the market transformation programs that program administrators might develop.

To me, the utility of the product is you start off with wet clothes and you end up with dry clothes. Whether it's through tumble action, the addition of heat, those are technical issues the consumer doesn't care about.

MR. BROOKMAN: Additional comments on definitions? We've talked about clothes dryers. How about gas and room air conditioners.

(No response)

MS. REICH: Okay. Well, as I mentioned, the definition of the product classes are going to be critical because each one of those product classes winds up with its own energy conservation standard. So we have to examine each during our analysis and look at the efficiency levels for each product class. So we take a great deal of care in figuring out how to group and categorize various types of dryers and room air conditioners so that we define the product classes most appropriately.

The criteria that we use to define the product classes, there are three of them. The first is quite straightforward. It's the type of energy that's used, whether it's electricity or gas. The second would be capacity, and that's defined according to parameters that are appropriate for each product. In the case of dryers, that's the drum volume measured in cubic feet. And for room air conditioners, it's Btu per hour of cooling capacity.

Then the third criteria that we use are the -- any sort of unique utility that's defined. That's how the consumer uses it, potentially how the product is installed. For example, if it requires connection to higher voltage input power or if it requires a water drain, that these are unique features that would, again, create a separate product class.

For clothes dryers, the -- we're proposing six product classes. If you're familiar with the previous rulemaking, you'll note that the first four product classes come directly from that rulemaking. These are dryers that are designated as vented. That is, that the moist, hot air that's used to circulate through the clothing needs to be exhausted from the unit to some external location. So we call these vented dryers.

Within that category we are subdividing them into electric units and gas units, depending on what type of energy supplies the heat for that drying air.

Within electric, we subdivide it further into standard-size, which is drum capacities of 4.4 cubic feet or greater, and compact ones, which are less than that.

And then within the compact capacity, that again is divided into two categories, two classes, that are differentiated by the power requirement, either 120 volts or 240. In those we make the differentiation for a couple of reasons. One is that there is a unique utility of only having a 120-volt power requirement because it offers the opportunity to install it in locations that just have standard residential wiring. You don't need to necessarily have the 240-volt capability.

Also, we consider these separate product classes because potentially the efficiency characteristics are different. A 120-volt heater has fundamentally different efficiency performance than a 240-volt. So we want to make sure that we're comparing two types of products that have equal opportunities for efficiency improvement.

So those were the four product classes that

came from the previous rulemaking. For this one we are proposing the addition of two new product classes that we are considering to be categorized as vent-less dryers. Typically this technology is condenser drying, but we want to describe these as vent-less because we want to capture the unique utility of the dryers rather than a specific technology. It's really the ability to install it in locations where a vent is not possible or not desirable.

So within these two categories we have defined two based on electric energy input. There are no gas units on the market because the combustion products from a gas dryer would need to be vented. So the only possibility here is for an electric dryer.

The two product classes we're proposing here are compact, and we've defined it as 240 volts based on our survey of available products on the market. They all are operating off of 240 volts.

The second would be a combination washer-dryer. This would be a unit that offers the -- both the washing and drying function within the same drum in sequence. We believe that these would warrant a separate product class because there may be some design tradeoffs associated with providing both of those functions in the same unit that might affect the

efficiency characteristics.

So we recognize that these vent-less product classes are going to require a change to the existing test procedure that Steve had discussed. Namely, there's going to be required a definition of which types of dryers would be categorized as vent-less and also there would be the removal of the requirement for an exhaust simulator so that you could test them in vent-less mode.

MR. CALABRESE: Dave Calabrese with AHAM. Are you asking for comments at these points?

MR. BROOKMAN: -- comment right now on this.

MR. CALABRESE: Okay.

MR. BROOKMAN: And then we'll move on to the others.

MR. CALABRESE: Okay.

MR. BROOKMAN: Since you know already you have comments on product classes.

MR. CALABRESE: Sure. We would support the classes as identified here one through six. We do have an addition we would like to propose under the vent-less category. As the Department has identified, this is a new category and we're all trying to find our way as to what are those products. They are a very small portion of the market right now, but they perhaps will

become a larger portion in the future.

So what we would recommend is a seventh product class under vent-less, and this would be identified as an electric, standard, 240 volts, 4.4 cubic feet or greater capacity. Otherwise, we don't have any further comments on the categories.

MR. BROOKMAN: Okay. Additional comments? Yes, Harvey and then Steve.

MR. SACHS: Doug rules. Harvey Sachs, ACEEE. In terms of the discussion we've had earlier this morning about the possible need to revise or augment the definition because there are non-tumbling products on the market, we certainly would ask under which of these categories you would want to think about microwave and heat pump water heaters as max tech or in other ways for your analysis.

We recognize that these are not now a factor in the United States market, but they do represent a reference point of what can be done and it is important that they be analyzed by the same methods we're using for other technologies.

MS. REICH: Well, as I mentioned before, these right now are technologies that we are going to be examining without specifically associating them with individual product classes. You'll see when I go

through the list of technology options we are open to considering all technologies for any product class to which it could be applicable.

MR. BROOKMAN: Let's let Dave Calabrese follow on, and then I'm coming back to you, Steve.

MR. CALABRESE: Dave Calabrese. You know, on behalf of AHAM, we're not opposed to changes to the definition that make it more descriptive. However, and we were going to reserve some of these comments for the discussion of the technology options. I mean, for instance, the microwave technology as we understand it, and I might let others speak to it in the industry. It's not really a valid technology at this time.

And so to -- to certainly change it to the definition to make it more effective we would support. At this time, at least for that one technology, we don't see that as a valid one. So in terms of changing definitions or even perhaps identifying the max tech, we would disagree. But I don't know; as we move forward we can discuss these issues further.

MR. BROOKMAN: That sounds good. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Just a quick one. The combination washer and dryers, they're covered under the clothes washer -- a question,

I guess. Are they covered under the current clothes washer efficiency standards?

MS. REICH: I'm going to have to defer that question to -- okay.

MR. BROOKMAN: As I cast my eyes around the room, I think we're not certain what the answer to the question is at this point. The Department is going to have to check on that.

MR. ROSENSTOCK: Steve Rosenstock. Just a follow-on. Ideally they are because it wouldn't make sense. You know, you're regulating them on the dryer side, not on the washer side. It doesn't really make sense, so.

MS. REICH: Right. And they are not currently covered on the dryer side. Okay.

MR. BROOKMAN: Thank you. So then, let's move on to room air conditioner product classes.

MS. REICH: Okay. For room air conditioners, NAECA originally specified 12 product classes, and these were units that are designed for window -- single or double-hung window installation or through the wall. The way that they were categorized was according to a cooling capacity and certain features that impact consumer utility. For example, the presence of louvered sides which allow different types of

installation and the capability of operating in a heat pump mode, which we designate as reverse cycle, so that it can heat as well as cool.

During the last rulemaking, four more product classes were added, two based on subdividing some of the -- two of the initial 12 product classes and two that were brand new.

So the 16 resulting product classes are listed here. They're grouped together by those without reverse cycle and with and without louvered sides, which were among the original 12. And then for both types -- both groups that had heat pump capability, the reverse -- with reverse cycle, with and without louvered sides, each of those originally was a single product class that was subdivided into two levels -- two groups of capacities.

And then the final two, numbers 15 and 16, were added based on the ability to install them in casement windows, not just standard single or double-hung windows.

Because of the large number of product classes listed here and because of the, you know, very large number of permutations of designs and efficiencies that are available among these product classes, we're proposing to conduct a full analysis on

three of them. We base these on the product classes that have the highest number of product shipments, namely those that don't have the reverse cycle but do have louvered sides.

The capacities that are selected are those -- the smallest units, those that are less than 6,000 Btu per hour, a mid range that's 8- to 14,000 Btu per hour, and the 20,000 Btu per hour capacity or greater.

One of the advantages of selecting these three is that by choosing the minimum and maximum capacities within this category we feel confident we have spanned all the potential technologies and efficiencies that are available within this category. So it gives us confidence that when we numerically extend it to product classes that we're not conducting a full analysis on that the results will be valid. So we're going to be interpolating between these to obtain the 6- to 8,000 Btu per hour and the 14,000 to 20,000 Btu per hour product classes.

We further propose that we're going to then extend the analysis, the results of those calculations, to other categories besides that to go to the categories with louvered sides and the ones with reverse cycle and casement.

I think I've lost the -- okay.

MR. BROOKMAN: Keep going.

MS. REICH: Okay. We have some precedent for doing this because we have done a similar approach when we analyzed dehumidifiers. So, you know, what we expect that we would be doing is to look at, at a baseline level, what the increments are in efficiency among the product classes and then increment from those baselines for product classes that didn't get a full analysis, that we would increment efficiencies based on the results from the ones that we do.

MR. BROOKMAN: So we have heard comment already on clothes dryer product classes and want now comments both on air conditioner product classes and also on the Department's planned approach to analyze the three representative product classes. Dave Calabrese.

MR. CALABRESE: Dave Calabrese with AHAM. We would support, first of all, the 16 categories, or I guess adding the additional categories at the end.

Now, as far as the analysis and which to choose from, certainly one, three, and five are appropriate and they represent a large portion of the market. However, there was some concern that in the analysis that would do quite a bit of extrapolation to other categories, which is reasonable in light of the

fact there are so many.

We would like to propose that the Department add a fourth category for its analysis and that's number eight, 8,000 to 13,999 Btus per hour. That would capture the without-louvered sides units. Thank you.

MR. BROOKMAN: Thank you. Additional comments on room air conditioner product classes and the Department's proposed approach.

MS. REICH: May I add one comment here?

MR. BROOKMAN: Please do.

MS. REICH: To your point, we will also plan to do some spot checking of units, a small sample of units that are outside the primary product classes that we're analyzing so that it will, you know, further validate our approach to make sure that the extrapolation to the other product classes is appropriate.

MR. BROOKMAN: Final comments on this set of slides before we move on? Yes, please. Your name for the record.

MS. BRUNK: Debra Brunk with AHAM. I just noticed that we missed Item 3-3 where we're looking for input on vent-less clothes dryer product classes. We did talk about that a little bit but did just want to

mention something along the lines of the energy calculations for the vented and the vent-less and just that the industry feels that those energy calculations should be approached a little bit differently, maybe with the vent-less dryers looking at a more holistic approach because you will also be affecting potentially the surrounding air in the room that that piece of equipment is in. Thank you.

MR. BROOKMAN: So certainly the Department would welcome more details about how to take that holistic approach. Yes, Harvey Sachs.

MR. SACHS: Harvey Sachs. I certainly appreciate Debra's comments on the ambient effects and would ask the Department at least to do a little bit of thinking about whether the induced infiltration associated with vented clothes dryers has an energy impact that's worth considering in terms of the descriptors.

MS. REICH: Okay. And I think that would factor into the potential modifications to the test procedure.

MR. SACHS: Yes, it would.

MS. REICH: Any inputs in that area would be welcomed.

MR. SACHS: And that of course is an annual

issue. It's not an easy one. It cannot be done perfectly. But the question is whether it would have consumer value proportional to the difficulties of doing it. Thank you.

MR. BROOKMAN: Thank you. Andrew DeLaski.

MR. DeLASKI: Kind of in the same vein, I think I'm concerned about, and not just from a consumer perspective but also from a national impact perspective, that we don't go down a rat's hole. This is a very complicated analysis for a product that may sell a relatively small portion of the overall market. It's a pretty complicated analysis to get into overall building impacts. The impact for the consumer may be minimal. The impact for the nation I suspect is even -- is microscopic, so.

MR. BROOKMAN: Okay. Additional comments? Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Just looking at this table with reverse cycle categories, with one it's less than 20,000 and then 20,000 Btu or more, and then go to 13 and 14 and there seems to be a little gap.

MS. REICH: Oh. Yeah.

MR. ROSENSTOCK: It says less than 14,000 and then 20,000 or more. Was that a typo?

MS. REICH: It's a typo. Yes, I believe that should be -- Product Class 14 should be 14,000 Btu per hour or more.

MR. ROSENSTOCK: Thank you very much.

MR. BROOKMAN: Thank you. Thanks for spotting that.

MS. REICH: Good catch.

MR. BROOKMAN: I want to make sure, following Debra's comment, that we don't slight Item 3-3, listed as -- on Slide Number 38. Are there any additional comments on vent-less clothes dryer product classes? Anything else that needs to be said there?

(No response)

MR. BROOKMAN: Okay.

MS. REICH: Most of the technology options that I'm going to be presenting are drawn from previous rulemaking because in many cases we believe that the technologies have not significantly changed since the time of the previous rules. So the list that we are considering for clothes dryers contains technologies that are largely already probably well known to you.

We have grouped them into three categories. The first would be technologies that affect the control or operation of the drum or design of the drum itself. These may include the termination -- automatic

termination strategies, modified operating conditions where the heat input rate or the cycle time may be changed, and also technologies that we've identified by looking at product literature for improvements made to the drum itself, features incorporated to surface textures or paddle designs that will improve the tumbling action.

The second category would be technologies that attempt to recapture some of the heat energy that's ordinarily lost through vented models in the exhaust vent that include perhaps injecting some of the exhaust air back into the drum or running it through a heat exchanger so that you can capture -- extract some of that heat and use it to preheat the inlet air.

The last category includes technologies that impact how the heat is generated, or in one case actually it's how heat would be removed. Here is where we would be examining heat pump designs and the microwave drying technology.

We're also going to be looking at two of these technologies which are new since the rulemaking which consist of the modulating gas option, in which the gas burner is provided with the capability of adjusting its rate higher or lower depending on the load requirements, and water cooling. This is for

condenser dryers that, rather than having an air-to-air heat exchanger you would have an air-to-water heat exchanger.

The last technology may be one that people aren't too familiar with. We've designed it as indirect heating. This is a hydronic-based system in which the hot water from the residential heating system would be routed through the dryer to provide the air heating for the drying action.

MR. BROOKMAN: Comments now. Yes.

MS. REICH: Oh, yes, and I just wanted to add, we recognize that the -- for this hydronic system, that too would require -- have significant impacts on the test procedure because it would require some means to capture the efficiency of the primary water heating system, not just within the dryer.

MR. BROOKMAN: So let's hear comments now on this array of technology options for clothes dryers. Dave Calabrese.

MR. CALABRESE: Dave Calabrese with AHAM. We do have some comments on these various options. I'll turn to Debra with AHAM as well.

MS. BRUNK: Debra Brunk with AHAM. I think an overall comment I think we have from our industry is this is a very long list and it will be a difficult

analysis. I think one recommendation we might have is, and I think this is part of the analysis, is to cut this down to some degree, particularly with the design option approach where the industry will need to come back with costs for all of these. That could be a very difficult process.

But in general, just a few comments as we went through this document. On Item 2, which is increased insulation, in general industry feels that increased insulation would have little impact on energy efficiency for the current type models that are out there. As soon as you do start getting into some of these other heat generation options that may have a lot more of an impact.

There are a few areas, again going back to the design option approach, which I know we'll get into a little bit later, that the industry feels we need a little bit of clarification on where, again, you start asking for cost information. One would be Item 3 in terms of modified operating conditions. What might those be specifically. Improved drum design would be another one. Again, what might be some specifics when it comes to looking at cost.

Another comment we had was on the water cooling, and you mentioned it with the indirect

heating. That's just, again, calculations would need to include water use cost and that kind of information as well.

And then finally, to go back, we've talked a little bit about the microwave technology. Just to reiterate Dave's point that this is an area that was looked at heavily many years ago. Since then there has not been a lot of work on it that has been successful, and we feel it may not be relevant out of the heat generation options that are -- the other heat generation options that are listed there. Thank you.

MS. REICH: I'd just like to point out that the list that you see here are -- is the comprehensive list that we're starting out examining. These are not necessarily the technologies that are going to propagate through to be the final design options that we analyze and that we request cost information from manufacturers on.

So it's likely that it will be a subset of these that we would be trying to obtain that information for.

MR. BROOKMAN: And so the Department would request your detailed comments on what should be in and what should be out and the rationale for that. Yes, Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, Edison Electric Institute. Excuse me. I know that EPRI did a lot of research on microwave clothes dryers back in the late 1990s and results were not that good. I think that the last research paper I saw they said they might look at maybe like a countertop microwave clothes dryer, like a portable one, as a technology option for small drying loads.

I'm not familiar with recent research. I don't know if EPRI has done anything in the last five or six years in terms of research on that. EPRI does have a Washington office. You may want to contact them to see. They might have a research project coming up. I know they're doing a lot more end-use technology research. They're kind of getting back into that game. So it might be worth a phone call or e-mail to see what they're doing. Thank you.

MR. BROOKMAN: Thank you. Yes.

MR. MANTHEI: Phil Manthei, Alliance Laundry Systems. We also would support removal of the microwave technology from the list.

Thank you, also, for some definition as to what modified operating conditions were and the improved drum design because we were clueless.

MR. BROOKMAN: Thank you, Phil.

MR. MANTHEI: We also would request to remove reverse tumble. I think most of that has been looked at in the commercial business. We're heavily into the commercial laundry market, and it's, you know, looked at for improved -- removal of wrinkling, mostly.

MR. BROOKMAN: Thanks, Phil. Andrew DeLaski.

MR. DeLASKI: I have kind of more of a process question. I don't have specific comments on these specific options. But you said in coming up with the options that you primarily looked at the prior rulemaking to come up with the options, and that rulemaking was initiated I think in the early '90s. So we're talking, you know, more than 15 years ago.

So I'm curious what other sources you went to to help flesh out the list or figure out what else should be in the list and to what extent did the Department go outside of it. Because I'm just concerned that we're repeating mistakes that happened 15 years ago, if mistakes were made. I'm not -- where else are we looking for options.

MS. REICH: Sure. In coming up with this list we did fairly extensive literature searches where we reviewed test reports and data that was generated from various sources. We do product information reviews where we, you know, look at the published

literature from the manufacturers. And in doing this also, we'll be speaking with various manufacturers to verify those technologies and to maybe learn about some others.

When we go through the process -- approaches where you do wind up condensing the moisture out, it would require some sort of collection or draining.

MR. DeLASKI: The only trick being that in general most of the dryers are designed to remove -- when the air leaves the dryer it's typically at about 100 percent RMC. Any effect upon that temperature at all will begin to condense out the moisture. So I mean, it's just pretty close right now. You're going to have trouble taking out much heat and not affecting the systems.

MR. BROOKMAN: Okay.

MS. REICH: For room air conditioners there are a number of approaches that can be taken to improve the efficiency. The most straightforward ones are associated with increasing heat transfer, either by increasing the surface area available to carry that out or by optimizing the heat transfer coefficient.

So within the increased surface area technologies that you could implement are increasing the coil cross-sectional areas or the number of rows in

the coil. You could also redesign the fins to increase the density or add a sub cooler to the condenser.

We understand that there may be certain limitations to implementing those based on the requirement to fit within a window. That dictates the chassis size and therefore the ability to implement some of these changes.

On the side of optimizing the heat transfer coefficient, there are possibilities to improve the designs of the tubes or fins themselves or you can spray condensate on the condenser coil. These are all technologies, again, that were drawn from the previous rulemaking.

One that has been added in for this particular rulemaking is the micro channel heat exchangers, wherein it's a technology that's widely used in the automotive industry in which the cooling passages are actually incorporated directly into the fins. We have some information on research that was done that indicates that it would be possible to incorporate that into a room air conditioner.

So another approach that can be taken would be to improve the efficiency of the individual components themselves: the blower, the motors, the compressor itself. These largely depend on the

availability of higher efficiency components from the suppliers.

Finally, we've identified technologies that can improve efficiency in the event that the effects of offload operation can be captured by the test procedure. That is, to go from a single-point EER measurement to a SEER measurement. These would include variable speed or multiple speed compressors or TXVs and various control strategies.

MR. BROOKMAN: Yes.

MS. REICH: We had some comment?

MR. BROOKMAN: Dave Calabrese.

MS. REICH: Okay.

MR. CALABRESE: Dave Calabrese with AHAM. On these proposed -- on these various technologies, the first overall comment is that one of the critical issues to consider -- and we'll discuss this as we talk more about the efficiency levels -- is the impact of the -- what we expect to be in 2010 the ban on the import of HCFCs in room air conditioners, as well as other products that use HCFCs. Currently the law provides for and allows for that import. In 2010 it will be, presumably, banned.

So it will have a significant impact on room air conditioners, which are primarily produced abroad,

which are using R22 and HCFC as the refrigerant.

So as kind of a threshold issue to reiterate this point. We'll be mentioning it again as we discuss further the efficiency issues.

Now, as far as some of the technologies here, we've looked at these, talked to the membership. We'll come back with written comments that identify these in more depth.

Items 1 through 3, these involve the increased frontal coil area, increased depth, and increased fin density. As we understand it, these all are -- changes to address these technologies would affect size, weight, and the noise of the unit, and in these -- in certain categories of room air conditioners -- they're very small. They're the highest market share in the market, and they -- if you were to make some of these changes, it would perhaps negatively affect the size and therefore utility for consumers.

So those are some initial comments on those categories -- on those items. I refer to these numbers. I'm referring to the ones in the framework document that DOE put out.

Item Number 8, and that is the micro channel heat exchangers. As we understand it, this would require a very significant retooling of the whole

process and therefore that would be something that perhaps need not be considered as one of these technologies.

Items 12, 13, and 14, again as we discussed previously, part-load performance, part-load technology we don't think is appropriate for a room air conditioner and therefore the Department may not wish to consider those technologies. Thank you.

MR. BROOKMAN: Thank you. Harvey Sachs.

MR. SACHS: Harvey Sachs, ACEEE. I very much appreciate David's comments. We obviously would not feel that change to the manufacturing process such as the transition to micro channel heat exchangers is necessarily ipso facto a reason not to consider the technology. That change is in process in other segments of the industry. It's a widely available product, product class or technology class. We think it should be evaluated. We have no idea whether it should be something that's determinative at this stage in the process.

MR. BROOKMAN: Thank you. Mike -- is it Varney?

MR. BEYERLE: Beyerle. Yes. Mike Beyerle with GE. Just to give a little more to what Dave said earlier in terms of the technology, you need to keep in

mind that most of the units sold in terms of these room air conditioners are small, lightweight units. People are hot some afternoon, the summer has come early, whatever it is, they go out and buy a small unit quickly. It's a very inexpensive unit. They take it home, they put it into place, they begin to use it.

The size, the weight, big difference as far as the ability of a person to take that product home and put it in their house and achieve a little bit of comfort.

In addition, most of these units, a lot of these units anyway, are often undersized for the use -- the rooms they're put into. Someone wants to take something small and easy home regardless of the size of the unit. They don't do a lot of calculations. They don't spend a lot of time figuring out exactly how many Btus per hour they need for that room. They just buy something small, lightweight, and inexpensive and drop it into place, turn it on. They run it full tilt.

If they're lucky, in general it will make the room comfortable enough for them. It will always make the room more comfortable, but it seldom achieves exactly, you know, a level of comfortable which you acquire by putting in a nice central air conditioning system. So the size and the weight makes a big, big

difference to the consumers in terms of that.

As far as the micro channel, they certainly do affect the performance. They will make the unit more efficient, but there's a big difference between a $30,000 automobile and a $100 room air conditioner. The units are inexpensive. People want them inexpensive because they buy them quickly when the summer has come early and it's just too hot.

MR. BROOKMAN: Thank you. Harvey Sachs.

MR. SACHS: So my comment -- hearing an endorsement of micro channels is something that adds efficiency and makes it smaller and lighter. Was that your intent?

MR. BEYERLE: It makes it more efficient. I never said it made it smaller and lighter. It's really much more expensive.

MR. SACHS: It's certainly the experience with some centralized air conditioner condenser units, so they become very small and presumably the substitution of aluminum with heat exchange area per pound of material for copper might have some effect on the take-home weight as well. But I appreciate your comments.

MR. BEYERLE: But there's a big difference between a $5- or a $10,000 -- or, a central air

conditioning system and a $100 portable room air conditioner.

MR. BROOKMAN: Thank you, Mike. Andrew DeLaski.

MR. DeLASKI: I guess my take on this is that at this stage of the analysis you're looking at technology options. You're not prejudging manufacturer impacts or consumer utility impacts. That's a different part of the analysis. So to knock something out here because we suppose -- you're presuming aspects of what happens in other parts of the analysis on the consumer or the manufacturer, those are valid concerns. They should be brought up at that point of the process.

But we don't knock out a technology -- we shouldn't be knocking out technologies because we're concerned that consumers won't be able to buy them. That's a concern that should be addressed in the analysis but not at this stage, in my view.

MS. REICH: That's correct, yes. Those are all issues that will be addressed during the screening analysis, and that's where we will be vetting the technologies to see which ones meet exactly some of those concerns that you have.

MR. BROOKMAN: Okay. Additional comments on

these technology options for room air conditioners at this time?

(No response)

MR. BROOKMAN: That's all you have, right?

MS. REICH: Yup, that's --

MR. BROOKMAN: Okay. So we're just a little bit behind schedule. Not much. Let's take a break at this point. It's now 10:40 by my watch. Let's take a 15-minute break, and we will resume at 10:55.

Okay. So, thanks for a good start on the day. We're making good progress here and we're covering a lot of ground.

(Brief recess)

MR. BROOKMAN: We are now moving on to a discussion of screening analysis and engineering analysis. Once again, Judy Reich.

Screening Analysis and Engineering Analysis

Judith Reich

(PowerPoint presentation)

MS. REICH: Okay. The second step in the ANOPR process is the screening analysis, which is the point at which we take all these technology options that we have identified, this whole universe of them, and we apply criteria to reduce them to the ones that we consider to be viable and to be carried through to

the engineering analysis.

The criteria that DOE is planning to use, is required to use, to evaluate each technology option, there are four of them. The first involves technological feasibility. Again, because when we survey the landscape of potential technologies that we are considering everything, we are now going to narrow it down to only those that have been demonstrated in working prototypes or have been commercialized. We are going to eliminate those that are only at the research stage.

The second issue, the second criteria that DOE uses is practicability to manufacture, install, and service. It is further qualified by the fact that it has to be -- meet these criteria on a time scale that is compatible with the effective date of the ruling and that it has to be manufacturable and able to be installed in service on a scale that would be appropriate for the market size.

The third criteria DOE uses is the impact on the consumers, whether this is product utility, whether there are features that are unique that the consumer relies upon, and availability to the consumer. It is not acceptable to create a standard that would eliminate a particular class of product that is

currently on the market, things that would have unique sizes or capabilities that would be eliminated.

Finally, of course, there can't be any adverse impacts on health or safety.

Although we don't have a comment slide here called out, we would certainly welcome stakeholder inputs at this point on the screening process.

MR. BROOKMAN: I have the general parameters listed here on Slide 43. Any additional comments on those?

(No response)

MR. BROOKMAN: Okay.

MS. REICH: So let me --

MR. SACHS: Excuse me.

MR. BROOKMAN: Yes.

MR. SACHS: Harvey Sachs. This practicability to manufacture and technological feasibility, you have said you will screen out approaches which are in the research stage and not available commercially as products. What is the boundary of -- the geographic boundary of that study? Is that North America or is that global?

The example I would use is if the -- if some unnamed country has 10 percent market share for heat pump approaches to clothes dryers, is that considered

to be commercially available?

MS. REICH: The way I -- my personal interpretation, and certainly correct me if I'm wrong, that that goes hand in hand with the practicability to manufacture. If the technology is on the market elsewhere and it is likely to be able to be manufactured domestically, then I believe that would meet the screening criteria.

MR. SACHS: Okay. If you'll allow me one follow-up. This is Harvey Sachs. Without prejudice and just as a matter of intellectual curiosity, but considering the difference between the two product classes at stake today, I'm not sure how the criterion of practicability for manufacture in the United States is brought into play.

MS. REICH: It is the --

MR. BROOKMAN: Ron Lewis.

MS. REICH: Yes. Okay.

MR. LEWIS: Good questions, Harvey, and we're here, as you're well aware, to listen and receive input and not to answer everything definitively today. So to Judith it's relatively new.

It's a lengthy process. Judy actually was very modest earlier in describing the fact-gathering process of trying to gather information. That's much

more comprehensive and aggressive than I was hearing her say in trying to look and identify technologies.

The screening process of looking at it and looking at the practicality and everything is something that -- they go through all the work to identify things and the decision point is not something that's cut and dry, easy, there's a one-sentence answer, we can say this is absolutely, you know, the way it's going to be. But we're trying to be comprehensive at the beginning and identify things to be considered.

So in due time you'll -- as you're well aware, you'll see, you know, the results of the screening process in the ANOPR and have a chance to interact with us again.

MR. BROOKMAN: Harvey, do you have a simple answer to your own question about the -- I guess the technology options as they are deployed predominantly in U.S. manufactured products versus, for example, the world? I'm paraphrasing.

MR. SACHS: Harvey Sachs again. It's very complicated issues. I don't have an answer. My concern is that we not use arbitrary criteria for screening out technologies that have been adopted elsewhere and are worthy of consideration at least to the stage of max tech.

Do I expect us to cut over to unobtanium-based clothes dryers or room air conditioners in the next cycle? No. But I would hope that we're focusing on what is being done elsewhere as part of our obligation for national energy savings and as part of the value for manufacturers who are increasingly faced with global competition as well as for consumer choice. So I'd like to keep it strategic. Thank you.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: Dave Calabrese, AHAM. I would -- I politely disagree with Harvey. I think what you're saying makes some sense. The one comment I would make; when looking at technologies that are manufactured, sold in Europe as opposed to the U.S., there are some significant differences as to consumer preferences, even home size and the like, where you may have different sizes. There's always of course the different issue of the types of electricity and the like.

So I understand what Harvey's saying and I do -- that makes some sense. We should consider carefully when looking at a European or some other technology that -- take into account the fact that there may be a different environment in which those products are sold.

MR. BROOKMAN: Thank you. Final comments on

this before we move on?

(No response)

MS. REICH: Okay. Let's move into the engineering analysis. I'm going to step through the first couple of slides fairly quickly because I think this is a process you folks are quite familiar with. But basically, the purpose of the engineering analysis is to define for each product class the relationship between the increments in manufacturing costs that are going to be required for incremental improvements in efficiency. This relationship is going to be input to the further analyses that would be used to calculate the net cost impacts on the consumers, namely the life-cycle cost and payback period calculations, the impacts on industry and the national energy impacts.

The methodology that we plan to use and that we have used before is first to very carefully define our baseline models. Typically, these are units that are common or have really fundamental characteristics, and we use these as the benchmark that we're going to assess the changes in cost and efficiency against.

So typically, for products that have existing energy conservation standards, the baseline models will be those that just meet that particular efficiency.

We then go through a quite extensive reverse

engineering process in which units that are selected based on a range of characteristics are taken apart, they're examined for -- to understand what types of technologies are implemented in them, what types of costs would be associated with manufacturing them.

We look at component costs and material costs and develop an overall "green-field" model. This is a model which captures the cost to produce the unit itself as well as to set up a factory from ground zero. These numbers that we are producing are intended to represent industry-wide aggregated values.

To supplement and validate them, we conduct a series of interviews in which we attempt to gain a better understanding of the strategies that may be taken to improve efficiency and what the costs associated with those are, and we also go through some data collection to produce supplemental points that we can compare against our cost efficiency curves. So ultimately, at the end, we are left with a series of cost efficiency relationships again for each product class.

Just to show it a little bit more graphically, the baseline model could be considered as a zero incremental cost, so that point represents the intercept on the manufacturing cost curve along with

the particular efficiency associated at that baseline level.

And then the reverse engineering fills in the curve to develop a straw-man cost efficiency curve. The third step is to take a look at validating data to make sure that the particular characteristic of that curve is reasonable. Where we identify particular discrepancies, if they're notable, then we would go back and perform additional reverse engineering at specific points to help us have confidence that the curve really represents the nature of the -- of that relationship.

So let's talk about the -- what we have defined as the baseline for clothes dryers. For the four product classes in the vented category, there are existing energy conservation standards that are defined according to -- the metric used is energy factor, defined as pounds of clothing load per kilowatt-hour per cycle. So these range from 2.67 to 3.13, depending on whether it's gas or the capacity. So that is quite well defined.

For the new product classes that we're adding, the vent-less units, we don't have any information right now to set those baseline values because there's no test procedure and no existing

standards. So we are really looking to stakeholders to provide input for us to be able to set those values.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. DOE is still planning to use the same efficiency metric, though, right? Energy factor, same as the other ones for the --

MS. REICH: Correct, yes.

MR. ROSENSTOCK: Okay. For the market. Okay. Thanks.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: Dave Calabrese with AHAM. You know, we would agree with the baseline levels. They are of course what is available, what we understand to be -- well, they are the standard as they are now.

On the vent-less dryers, of course we don't have any data. We would commit to be, of course, collecting this as part of the whole rule-making process and perhaps even prior to it to try to begin some of the data collection to assist the Department as it begins its analysis. So we'd like to help at these earlier stages.

MR. BROOKMAN: Harvey Sachs.

MR. SACHS: Harvey Sachs, ACEEE. Just a

cautionary note that there is some indication in the literature and in the results of prior DOE rulemakings on other classes of equipment that at least the lower part of your presumed cost efficiency curve is hypothetical if we move from cost to manufacturers to consumer prices that historically, for a variety of reasons, an increase in standards has not necessarily been associated with an increase in prices, leaving aside the commodity effects of the recent central air conditioner rule.

I just want to make sure that we're applying sufficient skepticism again at the lower end of this cost efficiency curve, where standards are likely to be implemented, about whether this will actually be revealed as a consumer price increase.

MR. BROOKMAN: Thanks. Additional comments on Slide 48, the energy factor?

(No response)

MR. BROOKMAN: Okay.

MS. REICH: For room air conditioners --

MR. SACHS: Excuse me. One other point.

MR. BROOKMAN: Harvey Sachs.

MR. SACHS: Harvey Sachs again. On Item 4, Slide 48, the energy factor presumably for gas is not in pounds per kilowatt-hour but in appropriate units.

MS. REICH: My understanding is that it is -- it may be -- it takes into account the energy consumption but that is converted into a kilowatt-hour metric.

MR. SACHS: Okay. Thank you. I'm sorry to reveal my ignorance.

MS. REICH: For room air conditioners there are existing energy conservation standards for all 16 product classes listed out here. Of course, the ones that we're going to be most interested in are the three product classes that we are analyzing, and you can see that those values range from an EER of 8.5 to 9.7, which almost represent the full range of EER levels for all of them. So that's some added confidence in selecting these product classes.

The metric for room air conditioners is a Btu per hour cooling capacity per watt. So this is a bit of an eye chart with a lot of values here, so maybe we can digest this for a moment and collect input.

MR. BROOKMAN: David Calabrese.

MR. CALABRESE: Dave Calabrese with AHAM. The -- as had noted before, we had suggested an additional category for DOE's consideration, Number 8.

In addition, again I'll be mentioning this throughout our discussions here, is the impact of the

change in refrigerant. DOE recognizes that there is an energy penalty to change from HCFC -- R22 and HCFC to an HFC. I think DOE estimates about a 5 to 7 percent penalty. We would agree with that assessment. That is probably at the higher end, more at the 7 percent penalty.

So when DOE conducts its analysis, this will have to be foremost in their -- in your mind as you consider costs going to new efficiency levels as you look at the baseline. So we as well in the industry will have to consider that as we consider moving to higher efficiencies. In and of themselves, moving to a higher efficiency product will involve added cost and there will be certainly additional added cost as a result of changing the refrigerant to new compressors and addressing that energy penalty.

So it's just -- it's something we want the Department to keep foremost in its mind as it moves forward with this analysis because it will have a significant effect.

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: Yeah, David Goldstein, NRDC. I wanted to comment on the change of refrigerant and how DOE does the analysis of this. I can't remember how -- what number of rulemaking this is where our

research showed that the efficiency of a compression device would go down when you changed the refrigerant as a prediction and then when the change was actually made that didn't happen and in many cases it actually went up.

So I would encourage the Department to look at predicted versus actual changes in efficiency upon change in refrigerant in air conditioners and refrigerators. We have a pretty -- and chillers. We have a pretty good, I think, data set of when these changes have occurred, and we ought to look at what really happened as opposed to what was predicted to happen.

MR. BROOKMAN: Thank you. Harvey Sachs.

MR. SACHS: I would scarcely hold myself out as an expert on refrigeration technologies, but I think there's reconciliation between the two Davids. Mr. Calabrese has given us the decrease in efficiency if we substitute 410A for R22. This is a rather stupid approach that has not been followed in most industries, and it is my understanding from the literature that if in fact we redesign the product to work properly with 410A rather than just substituting the refrigerant we can get improved efficiency and we certainly do not need to take a hit.

Now, I haven't discussed all of the cost tradeoffs, but the blanket assertion that we will have lower efficiencies because of the transition does not seem to be well supported as Mr. Goldstein has said.

MR. BROOKMAN: Mike.

MR. BEYERLE: Mike Beyerle with GE. I think what Dave's implying is that basic thermodynamics will show you that if you substitute you will have a less efficient system, which is what he's saying. We have to deal with that less efficient system.

If you make a more efficient air conditioner, you will have a more efficient air conditioner. I think that's all we're kind of saying, is that if we have to do the substitution it will immediately become less efficient. To get it back up to meet standards we will have to make it more efficient. If we have to make it more efficient beyond that, it becomes very, very difficult for the product.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I guess for DOE I think the main thing is that since, you know, the final rule for this rulemaking will occur I believe in 2008 for an effective date of 2011 -- I'll have to look back at the calendar in here. Wait a minute. 2008 or 2009. Oh well. It was back -- it's

in the beginning somewhere. I'm sorry? Oh --

MR. CALABRESE: 2014.

MR. ROSENSTOCK: Oh, 2011. Okay. So, okay. The final rule in 2011, to take effect 2014. The manufacturers will already have had to adjust their product for 2010 and that will probably impact the baseline cost. So that might be the key parameter, is how much did the cost of the baseline unit change because of the refrigerant change. Just another factor to consider. Thank you.

MR. BROOKMAN: David Calabrese.

MR. CALABRESE: Dave Calabrese. I agree with what Steve is saying. The concern that we had is that the data gathering will be commencing shortly. So we -- our manufacturers are not yet -- have not yet determined how in fact they are going to make this switch. It will involve a new compressor; we are almost certain of that. The current R22 does not work in the existing compressors because of many issues that I don't fully understand. However, it will require a new compressor.

So the concern is still where we are right now in this moment in time, which presumably DOE begins the collection in January. Manufacturers may still yet be in a stage where they don't know exactly how they're

going to be adjusting. So that is our primary concern.

MR. BROOKMAN: Thank you. Additional comments on these?

(No response)

MR. BROOKMAN: Did we miss anything that you wanted additional comment on?

MS. REICH: Not yet.

MR. BROOKMAN: No. Okay.

MS. REICH: Okay. We have a very important choice to make when we are conducting the engineering analysis. That is to choose which approach to use to perform the reverse engineering to come up with the costs associated with each efficiency level.

There are two possible approaches. The first would be a design option approach, and this is the -- what we are proposing to use for clothes dryers. In this strategy, you take a look at what particular design options are used and which design options -- or, what the costs associated with each of those design options are. You then layer possible combinations of these options to come up with incremental costs in efficiency levels above the baseline.

The reason that we're proposing to do that for dryers is that there just isn't a wide range of efficiency of units currently so that there -- it makes

much more sense to be looking at the individual details of them as potential efficiency improvements rather than trying to draw a representative sample at different efficiency levels.

As part of the reverse engineering, there would also be limited testing that's conducted so that we can verify what we have come up with in the tear-down process.

So as part of this, what we are asking from stakeholders is that we can come up with industry-wide data that would be disaggregated on the basis of each particular design option rather than -- sometimes we collect it as a function of efficiency level. But we're trying to get at what the appropriate costs would be for each of these technologies that can then be combined.

Conversely, for room air conditioners we're proposing to use an efficiency level approach. In this case, where there is a broad range of units that have various efficiencies already, it is reasonable to expect that we could pull out samples at, for example, baseline efficiency and an Energy Star level that we can use as the basis of our reverse engineering.

So in this case, what the validation data that DOE is seeking will consist of are those

incremental manufacturing costs as a function of efficiency level themselves. So then the cost efficiency curves are directly generated from those incremental costs.

To go through a little bit more detail on the reverse engineering, it is critically dependent on the units that are selected to undergo this process. So it's -- a lot of effort is spent in determining which platforms are going to be analyzed and which units within each platform in an attempt made to span a full range of various technologies so that we can get a true representation of the state of that particular product.

We subject them to physical tear-downs, where we take them apart and catalogue everything that's in there, which would include the individual components, the raw materials that are used, and even looking at what fabrication and assembly steps are used to turn the raw materials and parts into the finished product.

So at the end of this process we wind up with the green-field model which would be performed for either the efficiency levels at -- for an efficiency level approach or aggregated into efficiency levels from the individual design options.

What we seek as validation data would be industry-wide shipment-weighted data that would be

broken down into the components that relate to the full production costs for the individual products, as well as the one-time conversion costs that would be required to shift to a different standard level. For the full production cost, these would consist of your direct material on labor, factory overhead, and we also seek information on the depreciation method that manufacturers are using to expense their conversion capital.

For the non-production costs we're going to be looking at sales and marketing and R & D, but also assuming that potentially there could be investments required for a new facility. We would want to know what the building costs would be and new tooling and equipment costs. So the net result from those categories would be the manufacturer cost data that would be used as a validation and to supplement the cost efficiency curves from the reverse engineering.

MR. BROOKMAN: So, comments on, as you see on Slide 55, on the use of the design option approach for residential clothes dryers and also the efficiency level approach with respect to room air conditioners.

David Goldstein.

MR. GOLDSTEIN: David Goldstein, NRDC. The approach sounds pretty good with one or two cautions

here. The first caution is on the efficiency level approach. Existing high efficiency models of almost anything usually offer non-energy benefits as well as the efficiency benefit, and you want to make sure -- and your methodology would allow this, but you have to be careful in applying it. You're costing those things that provide only energy benefits and you're not adding costs for features that offer additional consumer values that they're just willing to pay for right now in Energy Star and better product.

If a new plant has higher labor productivity than the old plant, that's a benefit, and you've got to consider both sides of the equation.

MR. BROOKMAN: David Calabrese.

MR. CALABRESE: David Calabrese with AHAM. We would support the Department's approach on both products, the design option on clothes dryer and efficiency level approach on room air conditioners. I would caveat that by saying that the design option approach is the less preferable for the -- we believe that to do it in that manner there are some drawbacks. However, in light of the fact there is limited data available for these products, it appears to be the most reasonable way for the Department to proceed. So we would support that.

And of course, we would be collecting this data -- assisting the Department to collect the data and to aggregate it, as we have done in the past and have even begun the process now to consider such collection. Thank you.

MR. BROOKMAN: Thank you. Additional comments on these two approaches before we move on? Ron Lewis.

MR. LEWIS: One comment on the aggregation of data. Sometimes -- there is a long process to be able to acquire and put things together, and sometimes at the end of the pipeline the aggregation ends up that it's very difficult to use that to benefit the analysis. We've had some episodes in our history where that's happened.

So one of the requests would be before you go through a lot of effort to collect data, if we could be in dialogue to look at what level of detail would be useful. Because if it's too or too aggregated, sometimes it doesn't help us to make decisions. That's a frustration for all of us and a lot of wasted effort on both our parts, so.

MR. BROOKMAN: Okay.

MS. REICH: So, in defining the efficiency levels, first of all, these are going to be defined for

every product class uniquely. DOE is going to look at all efficiency levels between the baseline and the maximum that's technologically feasible, what we refer to as the max tech level.

What I'm going to present in a few moments is a maximum efficiency level that has been determined according to what products are currently on the market. So that really is more correctly termed a maximum available efficiency level. So for example, there may be a max tech level associated with a technology that's not widely available yet or commercially available.

So we specifically are seeking stakeholder input on how to resolve what this discrepancy is between max available and max tech.

Let me show you the efficiency levels that DOE is proposing for clothes dryers. For these products there is not currently an Energy Star program, and as we talked about before, there isn't a wide range of efficiency among available units.

So there are three efficiency levels that are being proposed. The first would be, of course, the baseline level. Level Number 3 is the maximum available based on a survey of various databases of recent product distributions so that we can, for most of the product classes, come up with a max available

level.

In between those two we have proposed two gap-fill levels. The purpose of the gap-fill is to fill out the cost efficiency curve in areas where there's a big jump between the baseline and the max tech. So we're able to specify values for those for the electric standard and for the gas clothes dryers.

In each case we tried to also associate a gap-fill level with particular efficiencies that are well represented by products already on the market.

For electric compact, 240 volts, I just want to point out that we were unable for the Efficiency Levels 1 through 3 to obtain any information on models in the U.S. and we did then proceed to use the NRCAN, the Canadian energy agency's database, for electric clothes dryers, presuming that there is a close connection between these two markets.

For electric compact at 120 volts, we were just completely unable to find information for a second gap-fill level. So for that in particular we are seeking input.

MR. BROOKMAN: Yes. Mike Rivest.

MR. RIVEST: Mike Rivest, Navigant Consulting. Of course one of the decisions that we talked about was doing efficiency level approach versus

design option approach. I think what this illustrates is the very narrow band that exists in existing product offerings. So to the extent that we would approach this with the design options, the concept of defining set levels for data aggregation is not necessarily relevant if we're going to be proceeding with defining a baseline model and then capturing data at the design option level, where we would then be looking for efficiency and cost data of design options and creating a cost efficiency curve with those.

I guess it becomes a matter of who performs that aggregation and provides the curve. So I just want to downplay a little bit in the design option concept this notion of set levels of efficiency. It gives us an expectation of what's in the market, but I wouldn't want to presuppose the outcome of the design option analysis.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: I appreciate that clarification. We had similar questions as, if you were to proceed with it as a line option approach, how this would be relevant. In light of the fact that this may have some value in the analysis, just to make a few comments. The gap-fills -- and I know that DOE is trying their best to identify some of these levels --

our view is, on some of these, for instance electric, standard and gas, the differences between a 3.10, a 3.16, or, on the gas side, a 2.75 and a 2.77, is minimal and perhaps even non-measurable in the sense that if you were to look at products and what the cost would be to get to various levels.

So our suggestion would be perhaps to take those and merge them into one level, one gap-fill level.

Again, this probably has less of an impact because of the fact you're using a design option approach. But if you were to use this to validate, I think, as you described perhaps merging those gap-fills into one may be more practical.

MR. BROOKMAN: Andrew DeLaski.

MR. DeLASKI: A couple of comments or questions. In response to your comment, Mike, then, about downplaying the relative importance of these levels, and I may be jumping ahead here, but then when you get to the ANOPR phase and you're developing -- the Department is publishing candidate standard levels, how does that work as a design option? Because normally you would see this and you would say, okay, that's looking like a candidate standard level for the ANOPR phase. But you're suggesting that perhaps not. Am I

reading -- am I hearing you right?

MR. BROOKMAN: Mike Rivest.

MR. RIVEST: That's correct. It may turn out that discrete technologies that we examine have different breakpoints or the range of efficiencies we come up with is different. We may be higher. So I wouldn't want to -- if we were collecting data at set efficiencies today it would be important to determine what those levels are. As you say, they could become candidate standard levels. But since we're not hinging the data collection on any specific efficiency levels, I don't think this is a critical discussion right now.

MR. DeLASKI: Okay. Even though it's not critical, I would point out that as we're -- to the extent there's a big move to validate the design option approach, I would suggest that you do need another -- another gap needs to be filled which is between levels two and three.

I mean, to the extent -- Dave Calabrese just pointed out how close one and two are together just from a mathematical perspective. You have a bigger gap between two and three. That's where the biggest gap remains. So I think there's a bigger -- there's a gap between two and three for electric and gas, which to me indicates that you would want to have another level

added in there. Keep the first two and add a third level.

MR. LEWIS: Doug?

MR. BROOKMAN: Yes. Ron Lewis.

MR. LEWIS: I believe that the tables were constructed from things that we found. We didn't construct this by design or say we want to have certain predetermined levels. So what we've got -- we're constrained by what exists. So I think we didn't have things to fill in in that increment that you're talking about. This was a summary of what we found for the levels, if I understand it correctly.

MS. REICH: That's correct, yeah.

MR. LEWIS: So I understand your desire, but the reality of what we could populate this with was what was out there, what we found available, so.

MR. DeLASKI: I guess my point is to the extent that technology -- and this is where the design option approach will take you, I guess -- the technology may result in options that don't exist on the market today, but you need to examine those options and there needs to be a level to consider those options.

MR. BROOKMAN: That was Andrew DeLaski. Additional comments related to the design option

approach? Yes, Tom Eckman.

MR. ECKMAN: I presume that because maximum available is defined differently than max tech that this will be extended to include max tech at some point.

MS. REICH: What we are particularly interested in is the -- how does the max tech relate to the max available. Can they be considered equivalent or are there other technologies available that would be -- produce a different max tech.

MR. ECKMAN: Well, certainly on your list of potentials for screening there are technologies that may -- I don't know what their ratings might turn out to be, but there are technologies that might push it. To my knowledge, there's no heat pump dryer available in the U.S. market and I have no idea what they might test out at with respect to the rating system we have here. But they may or may not fall within this range.

MS. REICH: That's right.

MR. ECKMAN: Not knowing that, it would be useful to ascertain whether they would or whether that would be a max tech level.

MS. REICH: Right.

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: David Goldstein with some

follow-up on that. For room air conditioners in particular, you could not possibly expect that the maximum available technology would have anything to do with the maximum technically feasible because the economics are so disconnected that no one ever has the incentive to go to the cost effective level.

If I go out and spend $100 on a room air conditioner, 6,000 Btu/h, it will -- 5,000 Btu/h, it will consume 600 watts. My local utility, or whoever they buy from, has got to go construct 600 watts. Actually, more because the real temperature is not 95 degrees on the condenser coil, it's probably more like 120.

But forgetting that even, 600 watts at the cost the utilities around here are paying for new watts is $1,800. So I'm spending $100 and society is spending $1,900, and I'm not even counting transmission and distribution, to buy an air conditioner and run it one hour a year.

No one ever sees the economic advantage of saving 10 percent of that other $1,800. So there is no economic reason for anyone to produce a product anywhere near the optimum and no sign that it's going to happen in the past. You basically -- because for central air conditioners utilities at least could say,

well, I'm going to -- it's going to cost me $1,800, I can give someone a rebate so they will buy the more efficient, more expensive product. For room air, you can't do that because if only one out of 10 of your rebate recipients wouldn't have bought the room air conditioner anyway then you've got more peak load problems, not less.

So standards become the only mechanism in this very broken marketplace for getting efficiency out there, and you couldn't possibly expect that the market would be anywhere near reflective of the life-cycle economics of the product.

So specifically, I think suggests an analytic direction for this product which is different than almost any other product DOE has analyzed. And that is, you should look at the first cost minimizing efficiency on a societal basis because someone is going to pay that extra $1,800 and it's going to be disproportionately poorer people, by the way, because electricity is a bigger fraction of the bill of poor people, whether or not they even run an air conditioner.

MR. BROOKMAN: Thank you. Yes, Phil Manthei.

MR. MANTHEI: Phil Manthei, Alliance Laundry Systems. I just wanted to point out that you used the

California Energy Commission database as of June. I think it's October 5th California Energy Commission required manufacturers to report their data based on the results of the litigation. So there should be new information coming.

MS. REICH: Yeah. They've been -- yeah. These levels will be revised based on further inputs that we do during the ANOPR analysis.

MR. BROOKMAN: Thank you. Do you wish to comment? No. Okay.

Okay. Other comments? Yes, yes. Steve.

MR. ROSENSTOCK: Steve Rosenstock, Edison Electric Institute. In terms of life-cycle cost analysis, I don't know if DOE has ever tried -- done -- well, you know, in terms of a societal cost analysis for an individual product, it -- the factors vary so much. Like, for electric generation, depending on the technology, can be anywhere from I'll say $600 per k-w for combined cycle gas turbine up to $2,000. It really depends on the technology you're looking at.

And you know, on the gas side too, well, how much does it cost to, you know, drill a new well versus importing from overseas. You're importing LNG. There could be costs on that side, too. And then, well, if you're producing in the U.S. versus producing overseas,

how much of a cost impact is -- I mean, when you start down that road there can be so many varying factors and the standard deviation gets so large it could be very difficult to -- for the standards rulemaking process. Thank you.

MR. BROOKMAN: Thank you. Yes. Let's go to Harvey.

MR. SACHS: Following up on earlier comments, I wish to call attention to Slides 57 and 58. The maximum available for both of these slides is footnoted as sources for information on products available in the United States. By using that criterion, we are excluding, as far as I know, technologies like heat pump water heaters. So that, as the dialogue with David earlier illustrated, it's very important to think about a broader sourcing and broader availability, particularly the European and advanced Oriental markets.

MR. BROOKMAN: Thank you. Yes, David Calabrese.

MR. CALABRESE: Dave Calabrese with AHAM. I think that this discussion between max tech and max available is traditionally one where there is some difference of opinion on both sides. I think I understand David Goldstein's comments and Harvey's

comments in regards to looking at these maximum technology products. I think there is a great amount of rationality and reason for the Department to look at what is available at this time.

There are many prototypes out there and many -- in some regards, in the previous rulemaking there was a max tech considered for dish -- for clothes washers or dishwashers that actually ended up being a hybrid. It was half of one product that was on the market and half of another. I think the Department was trying to find the best way to look at what was available, yet that wasn't a really rational approach in that the product, frankly, could exist but really didn't.

So we think looking at this maximum available is a reasonable approach to what is working on the market and what's available right now. So we would encourage this consideration.

MR. BROOKMAN: Additional comments?

(No response)

MS. REICH: We'll move to room air conditioners. I just want to point out that here there are several voluntary programs, the Energy Star program and CEE Tiers, Tier 1 and Tier 2, that have been specified for each of the three product classes that we

are proposing as our initial -- for initial analysis.

So I want to point out that we noted something interesting with the max available here, which is, again, just based on the survey of available information on CEC database. There were -- in the Energy Star database there were -- in two cases for the less than 6,000 Btu per hour and the 20,000 Btu per hour or more product classes that the CEE Tier 2 was actually more stringent or was a higher metric efficiency level than what was currently available on the market. So we can't actually propose a max available level that's above the Tier 2 level.

So, you'll do comments on --

MR. BROOKMAN: Yes. Comments on Slide 58, air conditioner representative product classes. Harvey Sachs.

MR. SACHS: This is of course preliminary and based on information that's not nailed down hard. It's my understanding, which may have errors, that the market share of the Energy Star room air conditioners is somewhere in the range of a third to a half of total sales. If that's the case, it's not clear to me why the Level 1 gap fill would be an important adjunct to the analysis.

MS. REICH: That gap fill was proposed

because the increments between Energy Star and higher levels are fairly small, whereas the difference between the current standard and Energy Star is a relatively larger change in efficiency. So we're attempting to simply fill in the section of that cost efficiency curve where the slope might be important.

MR. SACHS: I'm suggesting, I guess, that it's remarkable to the manufacturers that in this commodity market that you have identified there is sufficient existing differentiation that the Energy Star level is already a major factor in the market. Therefore, it's not clear why analysis of a gap fill at a level lower will help this proceeding.

MR. BROOKMAN: Mike Rivest.

MR. RIVEST: Mike Rivest, Navigant Consulting. If there were no gap fill, you would predetermine that the standard level, should there be a new one, could never be less than Energy Star.

He saw right through that.

(Laughter)

MR. SACHS: Harvey Sachs. I had never thought of that. Thank you.

MR. RIVEST: What happens, Harvey, is that as you analyze the manufacturing impacts particularly, what will happen is there will be a transition of

Energy Star at that point to a higher level. The combined cost of moving the baseline product to the new baseline and the Energy Star product to the new Energy Star is cumulative.

MR. SACHS: I'm sorry. It didn't occur to me that the manufacturer impact of Energy Star is part of this proceeding.

MR. RIVEST: This has nothing to do with manufacturing impact of Energy Star.

MR. SACHS: Isn't that what you just said?

MR. RIVEST: I -- the reality is that the effect of a new standard -- when we analyzed the effect on the shipments and the shipments impact, we looked at the base case where there is no new standard and we look at a world where there is a new standard, and it's recognized that after a new standard there is a new Energy Star. So we simply recognized that fact in our shipments forecast. That's all. I think that's been done as long as we've been rulemaking.

MR. SACHS: I appreciate that, but by the Energy Star criteria as I understand them, the Energy Star level is due to change anyhow because it's over a quarter of the models, assuming that models track at all with sales. So that, if there's any such correspondence, regardless of whether this standard

changes, I believe the current sales data would trigger a change in Energy Star.

MR. RIVEST: If that's something you believe, that's something that can be commented on and should be incorporated in the baseline forecast.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: I don't think it's assumed for the Energy Star room air conditioner program they're going to be changing the standard. I understand what you're saying about the current market share. The program, as I understand it, doesn't have -- hasn't made plans to revise it at this time.

It's not an automatic change. There are a number of programs with a wide range of market share. In some cases they do change at 25 percent, 30 percent, but there are many other factors that the program considers before they make a standard or specification change. So it has not been announced and as far as I know, I am not aware of any imminent change.

MR. SACHS: Harvey Sachs. Thank you, David. That's very helpful. Am I able to infer from your comments that in fact Energy Star does represent a market share of sales roughly in the range that I've suggested?

MR. CALABRESE: You cannot. I'm not

acknowledging that whatever -- you commented it was 25 percent to 50. I do not have the data in front of me. So I don't have any available data to comment upon that market share.

MR. SACHS: Thank you.

MR. BROOKMAN: Thank you. Additional comments with respect to room air conditioners, these product classes, and these efficiency levels?

(No response)

MR. BROOKMAN: Okay.

MR. SACHS: If I might, Doug --

MR. BROOKMAN: Yes.

MR. SACHS: -- offer one other observation. I very much appreciate the data that have been brought together. I find them very useful. I would just want to observe that the ranges of efficiencies in each column, excluding CEE Tier 2, which is not necessarily available, are relatively large compared to the efficiency ranges in some other products such as water heaters. They're on average two or three times the range that we see as product availability differences for water heaters.

MS. REICH: Just a couple other issues that I want to touch upon as part of the engineering analysis. The first concerns the topic of proprietary designs.

When DOE evaluates all the design options that are available, some of these may include proprietary technologies. We are very careful to try and make the process as transparent as possible while at the same time not appearing to favor one manufacturer over another.

So when we come upon proprietary designs that result in a unique efficiency level and there's no other means by which that efficiency level can be achieved, then in order to maintain confidentiality, that's going to be an efficiency level that we do not consider, that will not be analyzed.

I'm just going to move ahead to the regulatory changes. This is a topic that's been hit upon already but that as part of this rulemaking DOE considers outside changes that are beyond just the energy conservation standards. In particular, the one that has been most clearly identified for room air conditioners would be the phase-out of the R22.

My understanding is that there isn't really a consensus yet on which refrigerant is going to be replacing it but that the most likely candidate right now is going to be R410A. The information that we have observed so far indicates that there is an efficiency penalty associated with R410A that's on the order of 5

to 7 percent.

So how this plays out of course is going to depend on the compatible components that become available to the room air conditioner manufacturers. So it's not really clear yet what the types of compressors, for example, are going to look like. But we recognize that this will come into bear in this rulemaking and will potentially affect what the manufacturing costs are going to be to achieve even the baseline efficiency level, let alone the higher efficiency levels.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: A quick comment in that regard. First of all, is this the point, Mike Rivest, where you're looking at the manufacturer's impact -- the cumulative regulatory burden or is this a separate part of your analysis here as far as other regulations that could have an impact on a manufacturer as a whole but not specifically on manufacturing of room air or clothes dryers?

MR. RIVEST: You know, in the context of the engineering analysis, that would be more changes to the product, the baseline product for example, and other parts of the analysis would be more broadly.

MR. CALABRESE: I have only one small point,

then, to make in regards to refrigerant. This is proposed legislation right now in the Congress. We don't know if it will be enacted. However, it is proposed.

There is a proposal for adding a fee, a levy, at the time of purchase of a virgin refrigerant. This proposal is contained in a bill offered by Representative Waxman and would require manufacturers to pay this additional levy. The monies collected would go into a bank. The bank would use that money to encourage reclaimers of used refrigerant to reclaim these at the end of life.

For a manufacturer, the impact would be increased cost of refrigerant at the time purchasing it from the manufacturer of that refrigerant. So if this legislation, which has been introduced, is enacted, the system would be put in place and the law, or the bill at this time calls for a 30-cent-a-pound levy for the sale of any HFC, CFC, or HCFC. So we'll make that in our comments when we submit them.

MR. RIVEST: Mike Rivest. The relevance to the engineering analysis is that anything that would change the cost efficiency curve. So here you're talking about a cost per pound. Now, the assumption is that because of the timing of this regulation the

baseline product will be one without R22. So that's our baseline product. Then, as we push the efficiency on it, if there's a correlation between pounds of refrigerant and efficiency, then that would have an effect on the curve.

MR. BROOKMAN: Thank you. Harvey Sachs. Oh, Harvey, let's let Phil go.

MR. SACHS: Please.

MR. BROOKMAN: Phil.

MR. MANTHEI: I'm not sure if it's set at this point, but the clothes dryer has an outside regulatory issue potential that Underwriters Laboratory is changing the electric clothes dryer standard to include a fire containment requirement. We're understanding it probably will have a four-year implementation period. So if they would implement or publish the standard here this next year, we're kind of coming up on the same timing as this rule. So how that impacts the baseline product, we have to consider that.

MR. BROOKMAN: So, additional comments to that point would be very helpful to the Department. Harvey Sachs.

MR. SACHS: Phil, I hope that your comments will address whether this will have an efficiency impact as well as a regulatory input. The fire

suppression for electric clothes dryers.

MR. MANTHEI: I guess all I'm saying is we have to take into account that there is this regulatory issue going on. I'm not aware how that may or may not impact the efficiency.

MR. SACHS: This is Harvey Sachs. I would like to turn back to Slide 62 and suggesting that I'm not real comfortable with all of the bullets. As Mr. Rivest has said, our baseline will include the conversion already to non-ozone-depleting refrigerants. Dave Calabrese earlier said that the room air conditioner manufacturers have not yet seriously turned their attention to the design of models for that, if I understood him correctly, which would imply roughly a two-year -- assuming even a doubling of that, there are thermodynamic issues.

But the fact is that there are few compatible low-capacity rotary compressors on the market today, which seem to be irrelevant for a product for which the regulation will take effect in 2014. And I'm concerned that we not depend overly on assumptions like this when we've seen over and over again in a lot of fields that as the needs become clearer the component manufacturers, as well as the equipment manufacturers, respond in very creative ways.

MR. BROOKMAN: Thank you. Other comments on Slide 62 before we move on?

MR. SACHS: Of course, that -- Harvey Sachs again. That just reiterates my comments where there is a divergence of opinion of the 5 to 7 percent decrease in efficiency due to the refrigerant changeover.

MR. BROOKMAN: Right. The substitution.

MR. SACHS: The substitution versus redesign issue. And clearly there are differences in opinion there.

MR. BROOKMAN: Thank you. Okay.

So now we're moving on to preliminary manufacturer impact analysis. Constantin von Wentzel.

Preliminary Manufacturer Impact Analysis

Constantin von Wentzel

(PowerPoint presentation)

MR. von WENTZEL: Good morning, ladies and gentlemen. I'm here to talk to you about the process we're going to use for the preliminary impact analysis. That comes out of a legislative requirement that Judy talked to you earlier about on Slide Number 18, which is to assess the economic impact of standards on manufacturers, any impacts that energy efficiency standards may have on energy efficiency.

In 2006 we changed the process such that we

actually conduct these interviews before the ANOPR as well as after the ANOPR to get a better input from manufacturers regarding their key issues, baseline unit design, and any other factors.

In particular, we're at this point trying to -- the Department would basically like to establish the impact in terms of the conversion capital requirements, the research and development that may be required to achieve certain efficiency levels or the implementation of design options, and so on.

So we've got three main phases in the MIA process. We develop an industry profile where basically -- where the Department conducts a lot of research to establish the environment that an industry is operating in, which is to say how profitable is an industry, how many people are employed in it, what kinds of products are being manufactured and where and why.

We then develop an interview guide and then conduct these interviews with manufacturers to basically come to a better understanding of, you know, what is a baseline unit, what kinds of efficiency improvement opportunities are out there, comments regarding product classes, key issues, shipments, markets, and so on and so forth. We use that in the

ANOPR -- in drawing up the ANOPR because we would like to understand as best as possible what the key issues are for manufacturers.

So typically, manufacturers can give us very good feedback regarding the potential impacts of energy conservation standards. They basically allow us to verify that our market research was correct.

So as I discussed earlier, we evaluate the current market industry structure and produce an industry profile. We also try to identify any subgroups potentially at this stage if we can and come up with shipment projections, as is stated here, conversion costs, product mix, market shares, and any cumulative regulatory burdens such as the one that Phil just described.

And that, I believe, is it. Any questions?

MR. BROOKMAN: Mike Rivest.

MR. RIVEST: Thank you. The -- we've just gone through a first set of ANOPRS, if you will. We've just completed -- completing the ANOPR for AHAM 1 and for lamps and commercial refrigeration equipment. These -- having early interviews with manufacturers has been, I think, very, very valuable in that it's allowed us to narrow the field in terms of what the important issues are and to bring those forward early in the

rulemaking process and have them out on the table.

But also, it's been very valuable for us in validating our engineering analysis. I think in the past -- in past rulemakings there has been a concern that where DOE generates cost data and industry generates cost data sometimes they have been at odds. This has given us the opportunity to hopefully achieve some convergence through better understanding of how we're generating these curves.

So I think the preliminary -- the interview guides that you'll see for the manufacturer impacts you'll see have two components to them. They have an engineering analysis component and a manufacturing impact component to them, and the guides that are prepared are actually included in the TSDs for you to look at.

MR. BROOKMAN: Questions or comments on this set of slides, culminating in Slide Number 68 describing the methodology and these products?

(No response)

MR. BROOKMAN: So, that's all we're supposed to do before lunch?

MR. von WENTZEL: Yeah.

MR. BROOKMAN: Yes?

MR. von WENTZEL: That's it.

MR. BROOKMAN: We've made good progress. It's now 12:10 by my watch. It takes just about an hour typically to get lunch and get back. I have some suggestions for you for places close by which I'll say in just a moment. But let's do return and start back at 1:10 and make it through the rest of these detailed descriptions of the various analyses.

A F T E R N O O N S E S S I O N

1:10 p.m.

MR. BROOKMAN: So we made really good progress this morning, and we're just about right on schedule, just a few minutes behind. That's really good news. So we are moving on to, on your agenda, the one o'clock time frame, markups for equipment price determination, energy use determination, and life-cycle cost and payback period analysis. Greg Rosenquist.

Markups for Equipment Price Determination, Energy Use Determination, and Life-Cycle Cost and Payback Period Analysis

Gregory Rosenquist

(PowerPoint presentation)

MR. ROSENQUIST: Okay. Hello, everyone. As he said, I'm Greg Rosenquist from Lawrence Berkeley National Laboratory. I'm brand new to this. I'm only in my seventeenth year. So my hair is getting shorter, I'm getting older.

(Laughter)

MR. ROSENQUIST: Hope you haven't had too big of a lunch and can stay awake during the afternoon for all these details I'll be presenting.

I'll be carrying you through the rest of the ANOPR analyses, all the way through the national impact

analysis, and I'll be starting with the markups for equipment price determination.

What we're doing here is we're taking the manufacturing cost information that's generated in the engineering analysis and converting them into consumer retail prices and feeding that into the life-cycle cost and payback period analysis. We've already done some -- a little bit of work in this area to characterize how the products are currently being distributed from the manufacturers to the consumers. We've looked at some data, the AHAM fact book that says that over 93 percent of the products are distributed from manufacturers through retailers, retailers like Best Buy, Home Depot, Lowe's, Sears, those type of outfits.

So what we plan on doing is developing a markup for each one of those parties in the distribution channel. That is, a manufacturer markup and a retailer markup. For the manufacturer markup we plan to use filings to the Securities and Exchange Commission, these 10K reports, to calculate again those markups. For retailer markups we're going to be using U.S. Census Bureau business expenditure survey data, specifically for home appliance retailers.

What we may also do is go to Internet retailers and collect retail prices from those sites as

a way to validate the prices that we calculate from our markups approach. If we do go ahead and do that, we'll investigate the variability of those retail prices.

So at this point we're -- Doug, do you want to --

MR. BROOKMAN: Yes. Any comments or suggestions related to these estimates? You see a host of them there on Slide 70.

MR. ROSENQUIST: I just want to repeat; this is an approach that we've used in relatively recent rulemakings, so.

(No response)

MR. ROSENQUIST: If not, I'll move ahead with the next step in the process, which is the energy use determination.

The purpose of this analysis is to develop the annual energy consumption data for each of the efficiency levels that are being analyzed in the engineering analysis. These get fed into, again, the life-cycle cost and payback period analysis to eventually develop annual energy costs, coupling them with energy prices.

Our method is going to be relying on using EIAs, the Energy Information Administration's, residential energy consumption survey. So what we'll

be doing is developing these household samples that use clothes dryers and household samples that use room air conditioners.

I should go back and say that RECS is a survey that's conducted by EIA and it's 5,000 or so household records. That's representing the over 100 million households in the U.S. housing population.

So we'll be using this RECS data again to develop these household samples for each one of the products and then coupling that data -- coupling that with the data coming out of the engineering analysis, specifically capacity and efficiency data. We'll be using that to develop the annual energy use.

This provides a little bit more detail about exactly the approach we will be using to determine annual energy consumption. Let me first start with clothes dryers. The first step is to, again, use RECS. RECS provides to us directly the annual usage of the clothes dryers and cycles per year for each household record that has a clothes dryer.

So because we have that usage information, we can couple that with the energy factor data from the engineering analysis to develop an annual energy use for each household in the sample by efficiency level.

Now, for room air conditioners it's generally

the same approach, a little bit more involved. Again, using RECS, it provides us with the annual energy consumption for that room air conditioner for each household. We'll then be deducing from the room air conditioner's age the EER of that particular room air conditioner by using shipment weight and efficiency data. That's provided in AHAM's fact book.

And then finally, we'll be deducing the cooling capacity of that unit from the cooled square footage based upon basic sizing criteria.

So knowing those three values and using the DOE test procedure equation for calculating energy consumption, we can come up with the usage for each room air conditioner in the household sample. That will be in operational hours per year.

That DOE test procedure equation is annual energy consumption equals cooling capacity divided by EER multiplied by hours. And since we know three of those four inputs, we can calculate the annual usage.

Now, we're going to couple that usage with the data coming from the engineering analysis, specifically the EER and cooling capacity, to develop an annual energy use for each household record by efficiency level.

Yes, Steve.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, Edison Electric Institute. For the room air conditioners, does RECS have information about number of room air conditioners -- when they're doing their survey, number of room air conditioners per household? The reason I bring that up is because of diversity factors in usage of the room air conditioners.

And also, does it show what percentage of room air conditioners are also in the same household as a central air conditioner, where it's like a -- I'll say it's a supplemental or secondary unit being used?

MR. ROSENQUIST: Yes to both those questions. What we plan to do is exclude those households that have a central air conditioner and a room air conditioner because that annual energy consumption will be for all space cooling and not dedicated specifically to the room air conditioner.

For unit -- for households that have multiple room air conditioners, we're still thinking through this process but we're thinking that we'll just divide the annual energy consumption by the number of units to get an annual energy consumption per unit. Of course that implies a lot of things about the usage of the room air conditioner, but we think that will give us a

good rough estimate ultimately of the usage of the air conditioner.

MR. BROOKMAN: Yes, J.B.

MR. HOYT: J.B. Hoyt, Whirlpool Corporation. So as I understand it, you're using the RECS data, which is somewhat dated and a very small sample size. But you're using that for your cycles per year input only; is that correct?

MR. ROSENQUIST: Yeah. For clothes dryers the cycles per year, yeah.

MR. HOYT: Okay. And yet we've got a test procedure that would have presumably a different number. So, is that a disconnect in the process?

MR. ROSENQUIST: Well, that's one of the issues that's been pointed out with the test procedure for clothes dryers, that the current cycles per year are probably overstated. By how much is unknown, but from the clothes washer test procedure we know it's -- that was 392 cycles per year, I believe. It has a usage factor for the dryers of 84 percent. That brings it down to 329.

We have actually done some calculations already, and the number we're getting out of RECS is even a little bit less than that, maybe on the order of 10 percent. So we're thinking that the usage data out

of RECS is -- seems reasonable, in other words.

MR. HOYT: Oh, okay. I think most of us in the room would agree, given what's happened with clothes washers, that the dryer test procedure is today invalid in that regard. But if you're saying the RECS data is really supportive of that 329 or something in that neighborhood, then that's okay.

MR. ROSENQUIST: That's right.

MR. HOYT: I just -- disparate numbers there because the analysis would be invalid.

MR. ROSENQUIST: Right, right, right.

MR. BROOKMAN: J.B., before you go away, is that consistent with your knowledge and your experience? Does industry have data relating -- along those lines?

MR. HOYT: A little bit of data. I've not had a chance to explore what we might have in as much detail as I'd like, very honestly. The logic presented in the framework document, however, does appear reasonable to us.

MR. BROOKMAN: The logic? That's different from the data?

MR. HOYT: Well, no, I mean, taking it from where it was, 416 or something, down to 329.

MR. BROOKMAN: Okay.

MR. HOYT: We're comfortable with both the approach, and the outcome is in the right realm.

MR. BROOKMAN: Okay. David Calabrese.

MR. CALABRESE: Dave Calabrese. What Greg was saying does sound reasonable, as J.B. has noted. We do collect, of course, data on our products and consumer use data and the like. So I don't want to commit to anything here. I do want to further determine whether we have something that can perhaps supplement this, you know, considering this data is dated to 2001, so.

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: David Goldstein, NRDC. I have a couple of concerns about relying on the RECS database related to the fact that nothing is really being measured of these parameters. You're not measuring number of uses per year. At best, you're relying on self-reports and you haven't metered the air conditioner or the number of hours that it's on.

So if there's any other sources you can get that would corroborate or change the RECS-based data, I would encourage you to look into them.

I'm not saying that I can -- that they're biased in any way that I can predict, but they just -- the method doesn't seem very reliable. Self-reports on

energy use aren't very good. I know from travel behavior, travel surveys underestimate actual travel by different factors depending on different trip purposes and days of the week. So I would presume people are equally mistaken about reporting how many dryer loads or air conditioner hours they're using.

Secondly, I have a specific problem with relying on any residential number for room air conditioners because a lot of them are used in commercial facilities where the number of hours is drastically longer than the 500-ish range. I usually stay in a hotel in Washington, D.C. that conditions its space with room air conditioners, residential, consumer products, and they use 500 hours a month, not a year. I don't think that's that atypical.

So we need to take some look at where these things are ending up.

MR. ROSENQUIST: Dave, are you talking about an actual room air conditioner as opposed to a package terminal air conditioner?

MR. GOLDSTEIN: I can tell the difference, yes.

MR. ROSENQUIST: Okay. I just wanted to make sure.

MR. BROOKMAN: Thanks for clarifying that.

(Laughter)

MR. BROOKMAN: Let's be clear what we're talking about here. That's good.

Okay. Additional comments on this one? On this graphic. Yes, Andrew.

MR. DeLASKI: Just, Greg, in response to your calculation on dryers, I don't have any data on dryer annual energy or annual number of cycles. The one number that I'd urge you to think about and push on a little bit is the notion that only 84 percent of the laundry that goes into clothes washers gets -- goes into a dryer. I'm not sure where that number comes from or what it dates from.

It just -- I just think it needs to be thought about a little bit, whether that's an accurate -- the notion that 16 percent of the laundry is getting line-dried just doesn't sort of meet with my -- doesn't seem right to me intuitively. So I'd like to see where that data came from and if it still holds up.

MR. ROSENQUIST: Actually, if anything, it strikes us as being a little on the high side because you -- while there is some instance of line-drying, there are a number of things that don't get dried at all, that are just air-dried in the home, delicates and things like that. So I'm not sure 84 percent is -- it

may be too high.

MR. DeLASKI: My only point is that we should look at that number and see if maybe it's too high, maybe it's too low, where it came from, if there's alternate sources, whether industry has got them or someone else has got them. Let's look for other sources.

The other thought on room A/C is that you might check in with the folks in New York, who -- NASERDA and the PUC there, who's invested a lot of money in encouraging efficient A/C -- programs and such. They may have some data on room A/C energy consumption. They've invested a lot of rate-payer dollars in encouraging efficient room A/C. So NASERDA and the PUC may be good data sources for you.

MR. ROSENQUIST: Thank you.

MR. BROOKMAN: Did you -- no? Okay. Please.

MR. ROSENQUIST: So this is just our slide requesting comment. I think all the comments are now out on energy use determination. So we'll be turning to the next step in the analysis, which is the life-cycle cost and payback period analysis.

The purpose of this is to determine the life-cycle cost impacts and the payback period of standards relative to a baseline efficiency level for each one of

the product classes that we'll be analyzing in the engineering analysis.

The life-cycle cost, it's basically comprised of two components. It's the first cost, the total installed cost of that particular appliance, plus the lifetime operating expenses. Since, again, we're looking at operating expenses over the life of the equipment, we'll be using discount rates to get it down to a present value.

Again, this is being done from -- to emphasizes, it's being done from the perspective of the consumer. We're going to be implementing this analysis within a spreadsheet tool using Microsoft Excel for purposes of trying to make the spreadsheet tool as transparent as possible. So we'll be distributing that spreadsheet tool once it is developed.

We'll again be looking at results that are expressed as LCC differences. That is, the life-cycle cost difference between a particular efficiency level or standard level and a baseline level. We'll also be calculating payback, which is the change in the total installed cost over the change in the first year's annual operating expenses.

Now, the approach that we plan on using, as I think some of you may be familiar with, it relies on

using this Monte Carlo simulation technique. It relies on characterizing all the inputs to the analysis with probability distributions rather than single point values.

So what this Monte Carlo simulation technique will do is, going back to that RECS household sample, it will sample a household based upon its representativeness or its weight and then take from that the associated annual energy consumption that we've calculated for that household as well as its energy price. So even though each household will have a unique value, when you look over the breadth of the whole household sample we'll be capturing the variability in that annual energy consumption and in the energy prices.

Then we'll be combining that with these probability distributions that will be developed for the other inputs into the analysis, like the discount rates and equipment lifetimes. If we do use distributions for manufacturing costs, we'll be incorporating that as well.

One thing not itemized on this bulleted list is that this Monte Carlo simulation technique will be done by running 10,000 iterations. So we'll be basically performing 10,000 LCC and payback period

calculations. So we'll have a distribution of results which we can in turn calculate an average value from or a median value from as also a standard deviation.

We plan to conduct the analysis for each of the product classes that are going to be analyzed in the engineering analysis. That includes all six product classes for clothes dryers. That includes the vent-less clothes dryer product classes and the three product classes that were identified in the engineering analysis. Those are the ones that are without reverse cycle and with louvered sides and in those three capacity categories you see here on the overhead.

Another very critical part of this approach is to characterize how consumers are currently purchasing products today and capturing which consumers are already purchasing products above the baseline efficiency level. I'm calling this the base case efficiency distribution. What this does is to ensure that if a consumer is already purchasing a more efficient piece of equipment that they're not going to be counted in as part of the people benefiting from a particular efficiency level or standard. So this prevents overstating any possible benefits from a particular efficiency level that we'll be analyzing.

So this slide goes over the type of --

hopefully the type of information we'll get from stakeholders on the base case efficiency distributions. For clothes dryers we're asking for efficiency distributions for four product classes, the four vented product classes, in the particular efficiency bins that you see in this table. Of course, the efficiency bin values can change depending upon the input that stakeholders provide us.

I also wanted to note that we're not asking for information on vent-less product classes just because those products currently aren't rated and we're assuming that there's just no information on those products right now. But if there is, we would certainly love to take that.

On room air conditioners, again you can see we're looking for these base case efficiency distributions on these three particular product classes in, again, those particular efficiency bins that you see up there on the overhead. And again, those efficiency bins can change depending on the information we get from stakeholders.

So at this point we're looking for any stakeholder input on this approach of using Monte Carlo simulation for the LCC and payback period analysis.

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: David Goldstein, NRDC. This approach puts a lot of detail and effort into calculating the smaller impact on the consumer and ignores the larger impact on the consumer which I alluded to earlier, which is the subsidy by the utility system of the cost of electricity over the lifetime of the product.

Quantitatively, rough numbers, one watt of air conditioner at 500 hours a year is going to have a discounted present value of about 50 cents of lifetime consumer payments for the electricity. However, producing that one watt is $3,000 based on the actual costs of plants that are being approved or not right now by utilities in this general region of the country. Power has come up with that number and it's pretty typical for coal plants. Mr. Rosenstock presented some lower numbers. His lowest number, 60 cents, is still higher than 50 cents.

So the big impact is that you buy a watt of air conditioning and the utility spends from 10 cents to $2.50 on subsidizing your use of the air conditioner over its life. They get that money back from charging every other consumer on their system higher tariffs.

As I mentioned, this is a distributional impact. This is a winners and losers effect, and it is

bigger at its smallest than the effects that you're proposing to put so much effort into studying. So I think this is an essential piece of the calculation that needs to be done.

MR. ROSENQUIST: I guess the one comment or possible response is that I think Steve already alluded to the electricity prices being paid by consumers. I guess sort of a perfect regulated market should reflect the price -- the cost of supply to those consumers. So I mean, the intent is to capture, you know, that effect that you're talking about by using current electricity prices in the analysis.

MR. GOLDSTEIN: Well, no. The -- you're assuming something which is demonstrably wrong, which is that the regulatory system prices electricity properly. In California, where we've studied it in detail, we've come up with time of use pricing, and the price of a kilowatt-hour on peak is more than 10 times what it is off peak. And until your consumer pricing reflects I think it's 30 cents a kilowatt-hour -- maybe it's 50 cents -- for a lot of the times that these air conditioners are on, it will not give the right answer from a societal perspective.

If it's right from a consumer perspective, you're ignoring the subsidy. The subsidy, again, is

the big economic effect that's going on in terms of impact on the consumer, which is one of the criteria that DOE has to use under NAECA in evaluating economic justification.

MR. BROOKMAN: So David, I'm certain the Department would welcome your detailed comments about how DOE would consider these issues in their analysis.

MR. GOLDSTEIN: Sure. I mean, it doesn't have to be that detailed. It wouldn't be a tremendous amount of work to collect what the cost is of incremental generation and transmission and what the diversity factor is on room air conditioners and, on the other hand, the transmission losses and the performance at field conditions as opposed to the modest 95 degree condenser rating condition. You know, those are pretty straightforward, and even if you get it wrong by 10 percent, it's better to be approximately right than exactly wrong.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, Edison Electric Institute. There will be a trend for more advanced metering and technology where consumers will be able to see their electric prices change depending on their suppliers. I know that there are many places, such as California, where they have gone to critical

peak pricing. As I recall, the critical pricing tariff is the numbers that Mr. Goldstein was referring to where the critical price was about 10 times higher than the regular prices. Again, more or less. I'll say 60 or 69 cents a kilowatt-hour during critical peak times.

However, at other times it might be lower than the standard offer rate. If the standard offer is 14 cents, the non-critical peak time price might be 10 cents, and that critical peak price might be limited in terms of the number of hours per year. It can get pretty complicated depending on where you are and how the tariff is going to be structured.

I see where that could be going, but again, the problem that comes in is trying to predict that trend throughout the country could be rather difficult. But that is -- for this product in particular, that might have an impact for some of the hours but not for all of the hours.

So it's kind of -- and also, the other thing is also with some of these tariffs that critical price might be up to 100 hours a year but might really depend on grid or temperature conditions, where some years it might be 10 hours, other years it might be 100 hours. So again, it just adds a lot of chaos.

MR. BROOKMAN: -- rely on written comments.

So if people want to -- these methodologies, that -- I would like, though, right now for everybody to take a peek at Slide 79 and any additional comments on what should be there. Particularly, there are a lot of light boxes in this slide. If there are any comments to be made at this point on those.

MR. ROSENQUIST: Again, just to explain further, let's say for vented electric standard, the market shares that we're hoping to get for these efficiency bins would add up to 100 percent.

MR. BROOKMAN: Right. Dave Calabrese.

MR. CALABRESE: Dave Calabrese. AHAM will be collecting data, as we have done previously, and we will know more after doing that whether these bins are appropriate or not. At first glance some of them -- the level of detail may be too much. There may not be products in various bins. But we will collect the data and see what's available.

MR. BROOKMAN: Okay. Thank you. Other comments? Andrew DeLaski.

MR. DeLASKI: I'm sure you can find the data, but of course EPA has got data for Energy Star-compliant room air conditioners if you don't have it already. That would help fill in some of these boxes for you.

MR. ROSENQUIST: That's definitely one source of information for room air conditioners. You know, that's basically either in or out, though. I mean, we're asking for a little bit more detail about the actual distribution rather than what percentage are Energy Star. But again, that's definitely one source of information we can use.

MR. BROOKMAN: I wonder if there's any other source of that data. I see several -- for the record, several were shaking their heads no.

Okay. So let's proceed then.

MR. ROSENQUIST: Okay. What I'm showing you in this slide is something I think a lot of you have seen before, which is the flow chart for the calculation of the life-cycle cost and payback period and how all the inputs feed into that final determination of LCC and payback period. Let's just work through it.

On the upper left-hand corner are the inputs we get from the engineering analysis, which are the baseline manufacturing costs and the stair level manufacturing cost. Essentially that manufacturing cost curve by efficiency for each one of the product classes that we intend on analyzing.

The next set of inputs come from the markups

for price determination, which I just talked about. That's the manufacturer markup, the retailer markup, and the sales tax, which is used to convert the manufacturing cost into an equipment or consumer retail price.

That's combined with the installation cost, which is the cost of materials and labor to install the piece of equipment, if it's applicable, into a total installed cost to the consumer.

The next input, which I just got done talking about, the energy use, comes from the energy use determination. That's coupled with energy prices to give you an annual energy expense. That in turn is coupled with repair and maintenance costs to give you an annual operating expense, and then we're using lifetime of the product, discount rate, energy price trends to get lifetime operating expenses for the particular appliance. So when we add that with total installed cost, that gives us the life-cycle cost and the change in total installed cost and the change in the first year's annual operating expenses gives us the payback period.

So I'm going to go into a little bit of detail on the first one of these inputs, which is energy prices. Again, these are used to convert the

annual energy consumption into annual energy costs that again turn into annual operating costs.

What we plan on doing, what we want to do, is take information from the Energy Information Administration. This is Form 861 data. It provides the revenues and sales of utilities in the U.S. for -- also, the number of customers that those utilities service. So for each utility in the U.S., we can divide the revenues by the sales to get an average electricity price by utility.

Then, since we know the number of customers that are being served, then we can develop regional energy prices based upon whatever regions we want to look at. In our case, we're going to be looking at the nine census divisions and four large states. So we'll be looking at California, Texas, Florida, and New York. So, a total of 13 regions. So by developing average electricity prices for each one of those 13 regions, we'll be capturing at least at that level the regional variability of those electricity prices in our analysis.

For natural gas prices, because we need to do that for gas dryers, we'll be using EIA natural gas monthly data, which provides us with an annual average price of gas for each one of the 50 states. And again,

by using population data, we plan to aggregate that up into the 13 regions we're going to be looking at, the nine census divisions and the four large states. By doing that we'll be able to capture, again, the regional variability in those natural gas prices into our analysis.

We then plan to forecast those prices out into the future, because we have to look at the lifetime operating costs of operating the appliance, by using forecasts from the Annual Energy Outlook. That provides us with three price forecasts that we traditionally use, which is our reference case forecast, a high growth forecast, and a low growth forecast.

We also consider, you know, other types of credible forecasts that stakeholders may identify as sensitivities to forecast future energy prices.

So at this point I would like to take any input on this planned approach to develop energy prices for this analysis.

MR. BROOKMAN: Tom Eckman.

MR. ECKMAN: Tom Eckman, Northwest Power and Conservation Council. On -- as I recall, when we were involved in the commercial air conditioning rulemaking you guys went to some trouble to identify what the

pricing differential was for those air conditioners because they were running during peak periods of time. It strikes me a comparable kind of methodology ought to be applied here because, particularly in the large states, California, Texas, both are restructured. I think New York may have real-time pricing. The average revenue per kilowatt-hour is nowhere close to what the actual kilowatt-hour charge will be when these systems are running during the summer months.

So as David was trying to get at, you know, you can't get all the way to the avoided cost, but the prices that consumers will be paying during those periods of time may be quite different than they do pay on average. So, looking at the load shape of this equipment like we did commercial air conditioners and trying to identify what those prices might be, the RECS data and the EIA data doesn't reveal that. So you need to look beyond that first window.

MR. ROSENQUIST: Yeah. Again, what we did in that commercial unitary air conditioner analysis was actually take tariffs from a sample of 90 utilities. So we had on the order of 220 tariffs. By looking at those tariffs we were able to develop a marginal electricity price that corresponded with the load of representative commercial unitary air conditioners.

So that was a very in-depth analysis, and the question becomes whether or not, again, that's appropriate for room air conditioners. But I'll leave that for you guys to decide whether or not that is appropriate.

MR. ECKMAN: Well, if we're going to get the right prices that will be paid by consumers, and I think the trend is more towards real-time pricing than away from it based on all the automated meter-reading systems that are going in across the country that allow that. I'm pretty certain that by 2014 you'll see more than you do today of that kind of approach.

So forecasting that is -- it's a higher probability than probably was actually the case when we did the unitary air conditioners. So while the differentials clearly -- they're in some states now, so the tariffs are there.

MR. BROOKMAN: Thank you. Additional comments on energy prices? Yes, Harvey.

MR. SACHS: As a moderate but following on from what Tom has said, many of us, and I suspect it's approaching the majority in this country but I have not reviewed the data recently, pay rather different rates in the summer months than the winter months. They're rather higher in the summer months than the winter

months. And again, even if you don't believe Tom and David about peak pricing trends, the reality today is that we must acknowledge that most of us use our air conditioners very little during the winter but tend to operate them when the cost is high and the price is high.

So we must at very minimum base our LCC analysis on summer electricity rates rather than average.

MR. ROSENQUIST: Can I comment on that?

MR. BROOKMAN: Please do.

MR. SACHS: Please.

MR. ROSENQUIST: Again, you know, I'm thinking back into the analysis that was done for central air conditioners, and in there we used bill data -- the Residential Energy Consumption Survey. At that point -- at that time it was the 1997 survey. And from there we found that the marginal prices for central air conditioner consumers were actually lower than the average prices. The reason is because most of the air conditioners are in the south, which typically have declining block rates as their tariffs. So they're basically being charged less per kilowatt-hour for the electricity they use.

Now, again, that was 10 years ago. I don't

know if things have changed since then in the south, for example. I know things have always been different in the west and in the northeast. But again, the average marginal price, if you want to call it that, will really depend on where these room air conditioners are and of course how consumers are being charged.

MR. SACHS: I'm sorry, Greg. I appreciate your efforts in this area, but this is not an approach that looks toward national energy savings. It's not an approach that looks toward demand -- the ability to meet peak demands in areas where many of these units are installed. It just strikes one as being a rather academic castle that's not looking at -- looking realistically --

MR. ROSENQUIST: Well, the 2001 RECS has bill data that we've been able to obtain as well that we could develop our residential margin prices like we've done in the past. The problem is with the 2005 update I think EIA has said that they're not going to release that bill data any longer. But we'll certainly double check with that as another possible source in addition to possibly using tariffs.

MR. ROSENSTOCK: Again, Steve Rosenstock, EEI. If you want to collect data from investor-owned utilities, and I have contacts to the other ones too,

let us know. We'll be happy to make requests to our member companies to provide that data to you. That's no problem whatsoever.

MR. BROOKMAN: Tom Eckman.

MR. ECKMAN: Greg, I think EIA -- I mean, I think you can get a spreadsheet from EIA that gives monthly revenues and sales.

MR. ROSENQUIST: Yeah, so that -- yeah. During the summer months for those --

MR. ECKMAN: Yeah.

MR. ROSENQUIST: -- get the better price than the --

MR. ECKMAN: Be easier than the tariffs, so at least you get something approximately them.

MR. ROSENQUIST: Right.

MR. BROOKMAN: So let's move on, then, to maintenance, repair, and installation costs.

MR. ROSENQUIST: Yes. Maintenance, repair, and installation costs. The maintenance cost is the cost to maintain the operation of the equipment -- of the appliance over its entire life. The repair cost is the cost to repair or replace a component that's failed in the appliance. As I've said before, the installation cost is the labor and materials associated with installing that appliance.

Currently we don't have a lot of information about how the repair and maintenance costs change with efficiency, so we sort of want to move ahead with possibly an assumption of saying that those costs don't change appreciably as you increase the efficiency of the product.

On the installation cost, the same thing. Again, we don't have very much information to show how installation costs will very with efficiency, although we sort of think that they will change if the product gets significantly heavier or larger due to the -- due to being more efficient.

So basically, we're looking for stakeholder input on whether or not we can assume that maintenance, repair, and installation costs basically stay constant as you move product efficiency upward.

MR. BROOKMAN: Comments. Yes, Dave.

MR. CALABRESE: Dave Calabrese. I think as you look at more new technologies like the heat pump technology and others that are being proposed, this assumption doesn't follow. They are more complex. They require more parts and technology and therefore there would be enhanced repair as well as installation costs. That's one caveat.

MR. BROOKMAN: Yes.

MR. MANTHEI: Phil Manthei, Alliance Laundry Systems. We would echo what Dave has just said. Obviously, heat pumps and parts for those are much more heavier and complex than the traditional clothes dryer parts that maintenance people are carrying today.

MR. BROOKMAN: Thank you. Yes, please. Mike.

MR. BEYERLE: Mike Beyerle with GE. In addition, as you get -- particularly on dryers, as you get more complex you start heading into the realm of condensation, dryers which either reuse the heat and allow the moisture to condense back out, or use water to condense the moisture from the hot air. Both of those require plumbing being added to the dryer, they require drains being added to the dryer, things which don't currently exist in installations today. They will add to both cost of installation as well as complexity of the systems.

MR. BROOKMAN: Thank you.

MR. ROSENQUIST: The next input are the appliance lifetimes, and the first thing is that we -- DOE plans to use the same appliance lifetime for the baseline product as the more efficient product. We're not going to assume that the lifetime of the product changes as you increase the efficiency of it.

Past DOE analyses have shown that clothes dryers have an approximate lifetime of around -- average lifetime of around 13 years and room air conditioners 12 and a half years. So -- but although these DOE analyses have been conducted, we're still looking for stakeholder input as to whether or not these lifetime values are actually still representative of room air conditioners and clothes dryers.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: We've looked through some of the materials we have as well as publicly available information. First of all, on clothes dryers, Appliance Magazine just this year, this past year in September, reported lifetime for dryers at 12 years. So, one year shorter than what you have identified here.

Room air conditioners, that 12.5 years is quite long for a product that, depending upon the category, can be as short of a lifetime as five years and for some of the others perhaps a little longer. We've seen data that we need to confirm around a 8- to 9-year product lifetime for those products on average.

MR. BROOKMAN: Other comments on product lifetimes?

(No response)

MR. ROSENQUIST: Okay. And the last input I'll be discussing for the LCC and payback period analysis are the discount rates. These are used to convert those streams of annual operating expenses over the lifetime of the equipment down to a present value. We plan to use a similar approach that we've used for recent residential product rulemakings, and that's to develop a discount rate from the finance cost of purchasing the appliance.

What we'll do there is basically determine the interest rates associated with a purchase that's done with debt, like a credit card or a home equity loan, and also the interest rates associated with the opportunity cost of equity, such as money being pulled out from stocks or bonds or savings accounts or mutual funds to purchase the appliance.

We plan to use the Federal Reserve Board's Survey of Consumer Finances, which gives us that data that shows how consumers handle their debt and equity. They also provide some of the interest rates associated with that debt and equity.

So again, we're looking for input on this planned approach to develop discount rates.

MR. BROOKMAN: And potentially other sources, if there are any. Harvey Sachs.

MR. SACHS: Harvey Sachs, ACEEE. This is certainly a good stratospheric view of what you all are planning to do. But I assume that you'll be documenting -- what I'm hearing is sort of an approach that will blend various sources of money to the consumer and assume that this will be done rather transparently with adequate reference to particular percentages of consumers you expect to be doing particular things.

MR. ROSENQUIST: Yeah, that is correct. That Survey of Consumer Finances gets down to the consumer level and identifies what percentage of them hold a particular amount of debt and what percentage hold a particular amount of equity. And then again, since we have this approach of developing the finance cost based upon their debt and equity, that survey allows us to develop an appropriate weighted average discount rate for consumers.

MR. SACHS: Thank you.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: Two questions. First of all, is this the same approach you've used in the past?

The second one is, and maybe answering Harvey's question will get to this, is that for a product that's -- this is getting somewhat simplistic,

but a low-price product, a $90 room air conditioner, you may not be using your home equity line or credit card for that. You're more likely to pay cash and the like. Would your formula take into account the low cost of some items and perhaps the higher cost on others? Is that possible?

MR. ROSENQUIST: First of all, let me answer your first question. Yes, it is the same sort of approach we've used in the past.

And the second is that, no, I mean, this Survey of Consumer Finances doesn't get down to that level of what type of purchase is being made, for example, and what sort of debt or equity could be used to make the purchase. So if you have any data to say that, you know, it's more likely that consumers of room air conditioners or clothes dryers would use debt more than equity and one type of debt more than another type of debt, that would certainly be really useful information.

MR. BROOKMAN: Tom Eckman.

MR. ECKMAN: Greg, I'm not familiar with the Federal Reserve Board's survey. Do they include in that how many consumers are paying their credit cards off monthly so they're not incurring those interest rates?

MR. ROSENQUIST: Actually, I believe it does. Actually, I believe it does. I can't say for certain, though, unfortunately.

MR. ECKMAN: Because it seems to me that -- I mean, there are a fraction of the population that still manage to do that despite the preponderance of evidence to the otherwise.

MR. ROSENQUIST: Right. Where you're going with it, and that's that they use a credit card. In actuality they're not paying with the interest rates associated with the credit card.

MR. ECKMAN: Right. So, weeding that in, whatever that fraction is, I have seen data on that in the past but I haven't seen it -- I don't know whether that survey contains it. But that ought to be part of the weighting.

MR. ROSENQUIST: Okay. This is supposed to be a break point. Should we keep it rolling?

MR. BROOKMAN: Keep going for a little bit longer, yeah.

MR. ROSENQUIST: Okay.

MR. BROOKMAN: We didn't reconvene till almost ten after one. Harvey Sachs.

MR. SACHS: This seems to be about the end of the road for the life-cycle cost portion of our

discussion today?

MR. ROSENQUIST: Yeah, for the most -- yeah. But we can always return to it, but yeah.

MR. BROOKMAN: Let me state also that any of you that wish to emphasize a point or make a comment at the end of the day, you're welcome to do that.

MR. SACHS: This is Harvey Sachs at ACEEE. There are two things that are very striking about the discussion of life-cycle cost, and one of them is the tremendous amount of uncertainty involved in so many of the parameters that are important -- are key inputs to it. To some extent you attempt to compensate for that with the Monte Carlo analysis.

The second thing that's really striking to me, not from this analysis which we haven't seen because it hasn't been done, but from the recent furnaces and boilers is how often a large number of possible recommendations for standards levels have inconsequential, meaning less than 1 percent, differences in life-cycle cost.

So I've sort of felt that life-cycle cost is an important guide, but when it comes down to making decisions with all the uncertainties we've seen on the basis of a $50 difference in a $17,000 life-cycle cost, we're putting the tail ahead of the dog.

So the question is specifically formulated as the extent to which the life-cycle cost analysis with its uncertainties will be taken as the rule as opposed to a guide from which there is called an uncertainty band and we will be making decisions based on a list of parameters that Ron shared with us earlier on how the standards should be set. Thank you.

MR. BROOKMAN: Okay. Then, on to shipments analysis.

MR. LEWIS: Doug? Just one point here.

MR. BROOKMAN: Yes.

MR. LEWIS: In the seven criteria that were mentioned earlier this morning, Slide 18, there are -- the first two items that statutes have directed us to use and consider the way of providing -- showing that we've considered those is through the life-cycle cost. So that doesn't directly answer Harvey's question, statement, stand, whatever, but it's a -- I mean, we do have to consider it, but we'll take into account here his advice of considering how heavily to weigh that.

MR. SACHS: Again, Harvey Sachs. Ron, the point is only that the goal of the standards process is to save the maximum energy, technically feasible, and all that sort of good stuff. And economically justified. I didn't mean to leave that out.

(Laughter)

MR. SACHS: I am approaching senility from the senile direction.

And it seems to me that the other factors are boundaries placed on our process. And it's only to be hoped that your group will have the wisdom to understand the limitations and that a difference in the fourth decimal is not necessarily a basis for choosing between one standard level and another, particularly given the uncertainties.

So I'm sure Dave and I would disagree on which side that judgment should go, but we'll keep -- each of us will keep pushing.

MR. BROOKMAN: Shipments analysis.

Shipments Analysis and National Impact Analysis

Gregory Rosenquist

(PowerPoint presentation)

MR. ROSENQUIST: The shipments analysis is conducted to develop shipments forecasts that are fed into the national impact analysis. Again, the purpose, again, is to quantify the product shipments or the shipments forecast for a base case -- that is, the case without standards -- and the various standards cases that we'll be looking at.

The method will rely on developing a

shipments model, which will rely on a range of data sources, including historical shipments, which will be used to help calibrate that shipments model.

I want to emphasize that the only products that we're considering here are room air conditioners and clothes dryers. No other products will be considered.

Again, that shipments model will have two purposes. One is to estimate shipments over the -- from the effective date of the standard to the life -- over this 30-year analysis period that's typically used by DOE. And we'll also be keeping track of the stock of appliances that come into the market over that same period and keeping track of the age of that equipment so we can appropriately assign the annual energy consumption and the annual operating cost for that equipment.

The first step in our shipments analysis again is to develop a shipments forecast for the base case, and I'll emphasize the base case is the case without standards. We do that through accounting for two primary market segments, the new construction market and the market of replacements. That is, for units that are failing, the shipments that are going to replace those units.

In doing this estimate, the shipments forecast, we also develop a historical forecast, what I like to call a "backcast," and we calibrate that backcast to see how good our model is to historical shipments data.

Any discrepancy between the backcast and the historical shipments we plan to attribute to existing households that don't already own the appliance. So we'll be determining a historical adoption rate for those existing households that don't already have the appliance and carrying that forward to estimate the shipments that are going to that particular market segment.

Our data requirements for new construction will be using the housing construction forecast from EIA's Annual Energy Outlook, and we'll combine that with historical rates of product ownership or saturation rates that we know are available already from RECS and also from the AHAM fact book.

We'll be calculating replacements using product lifetimes and the retirement functions that we develop in the life-cycle cost and payback period analysis. And of course, most importantly, we'll be using historical shipments to again help calibrate our shipments model.

So although I've already said that, you know, we're calculating -- we're determining saturation rates with the AHAM fact book and the RECS data, we're also looking for any other data that might be out there for determining those values.

MR. BROOKMAN: For the entire forecast period.

MR. ROSENQUIST: Well, you know, we're -- well, for the year -- for recent years, recent historical years. Because that will guide us in terms of, you know, the current stock of appliances. And also, we would like a saturation rate -- adoption rate of new construction, again to tell us how -- what percentage of the appliances are going to be going to new construction.

MR. BROOKMAN: Yes. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. At least in terms of new homes, single-family homes, NAHB does do saturation of central air conditioners. So there -- and they do it year by year. So there should be that data available nationally if not regionally from NAHB. I've gone -- they have a good website. They have data on their website.

The second thing, following up to Mr. Goldstein, I don't know if there's a way to do it, but

especially from air conditioners, I don't know if there's a way to get any sort of residential versus commercial saturation for room air conditioners. As he said, there are room air conditioners used especially in older buildings, around here older government buildings that never had central air conditioning. They've just put room air conditioners in a lot of available windows in the D.C. area for some of the old buildings you'll see.

I don't know how to get that data, but if there's a way to, at least kind of current saturation. I don't know about future. That might help your analysis as well in terms of hours of operation. Thank you.

MR. ROSENQUIST: On that note, for central air conditioners, back when we did that analysis, ARI provided us with the percentage of shipments that are going to commercial applications. At that time they estimated that 90 percent of shipments went to residential households and the remaining 10 percent went to commercial buildings.

So that would be great, if we could get that information. If AHAM or any manufacturers or any people from industry have that information, it would be very useful.

MR. BROOKMAN: Yes.

MR. MANTHEI: Phil Manthei, Alliance Laundry Systems. Just an inquiry. Was there a forecast made in the -- I guess we did up to 1998 -- with the prior rulemaking for clothes dryers?

MR. ROSENQUIST: The last rulemaking for clothes dryers was back in -- I think it ended in 1991. So for clothes washers they did a forecast of clothes washer shipments, but not for clothes dryers, I believe.

MR. MANTHEI: Okay.

MR. BROOKMAN: Okay. So, other comments and particularly sources for shipment data?

(No response)

MR. BROOKMAN: Okay.

MR. ROSENQUIST: So this slide for clothes dryers just asks in tabular form the type of historical shipments data that we want. We already know -- we already have AHAM fact book and Appliance Magazine. That gives us total clothes dryer shipments. But we want shipments in each of the six product classes that we're going to have to analyze. So that includes not only the four vented product classes but those two vent-less product classes.

And this slide shows you the information that

we want for room air conditioners in terms of historical shipments data. Again, that AHAM fact book and Appliance Magazine, they provide us information on the total shipments, but again we need to break that down by the 16 product classes that are out there for room air conditioners.

MR. BROOKMAN: Dave Calabrese.

MR. CALABRESE: Just a comment. We will be attempting to collect that data and provide that to you.

MR. BROOKMAN: Thank you very much. Other comments related to Slide 90 and 91, the air conditioner and -- room air conditioner and clothes dryer historical shipments? You can see how they've subdivided those data.

(No response)

MR. BROOKMAN: Okay.

MR. ROSENQUIST: Okay. Let's move forward. Now that we will develop these shipments forecasts for the base case -- again the base case is the case without standards. We're going to have to develop forecasts for the standards case. That's the case with standards.

And essentially, we'll be using the exact same shipments model and the exact same data to develop

our standards case shipments, with one important exception. We'll be trying to take into account the purchase price increases and the operating cost savings caused by the standard to figure out how that impacts the shipments forecast.

Typically, this data is very difficult to obtain. It's very difficult to get information on exactly how standards have affected product shipments. So if it becomes too difficult to do any sort of type of analysis, we may use scenarios to estimate particular shipments forecasts for specific standards cases. So we may assume, let's say, a 5 percent drop in shipments for a relatively stringent standard level or something along those lines.

We'll also consider any future market poll programs, like Energy Star or tax credits, and how that possibly could work into estimating the shipments.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Just a quick data point. Since room air conditioners, the new standards went in effect in 2001, I believe? Or 2000.

MR. ROSENQUIST: 2000.

MR. ROSENSTOCK: 2000?

MR. ROSENQUIST: Yeah.

MR. ROSENSTOCK: Was there any change in

shipments that year? Just as kind of a --

MR. ROSENQUIST: Well, actually, shipments -- I mean, room air conditioner shipments are relatively volatile, but over the last four years they've been going like gangbusters. So it's -- from that, too, it would be hard to determine whether or not any sort of effect was due to the standard.

So as part of this preliminary manufacturer impact analysis we'll be asking manufacturers for their input as to how standards may impact shipments. And of course, any other stakeholder will also -- can also provide information as to how they think these shipments forecasts will be impacted by standards. We're looking for that type of information.

We're also looking for any information on market pull programs and how, again, that might affect our estimates of shipments.

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: Yeah, David Goldstein, NRDC. It really does strike me from this quick dialogue as worth going back and seeing what the effect on shipments was predicted to be from the last rule and what it was because these models are very speculative and assumption-driven, and if you can normalize them to real-world data, that's going to help.

And if you can't determine what the effect was from real-world data, that's an interesting observation, too.

MR. BROOKMAN: Other sources of data for market pull programs? I guess they don't -- Tom, they don't sell all that many room air conditioners in the northwest?

MR. ECKMAN: More all the time.

MR. BROOKMAN: More all the time. Yeah, Steve.

MR. ROSENSTOCK: I will send in my written comments. There is an organization called -- it's the Solar Center in North Carolina. They have a very nice database of basically all efficiency programs, kind of state by state. I'll try to send you that link because they do a very nice job.

MR. ROSENQUIST: That would be great.

MR. ROSENSTOCK: So that's another source. In terms of market pull programs that's a good data source.

MR. ROSENQUIST: Okay. Finally, the last analysis step in what we do for the ANOPR, and that's the national impact analysis. The purpose of this analysis is to determine the national energy savings and the national consumer economic impacts from

standards that we'll be analyzing for clothes dryers and room air conditioners. We do this by developing an annual series of values from the first year that the standard becomes effective over this 30-year analysis period. We do that for both national energy and the economic impacts.

We utilize that shipments model that we're going to be developing to estimate a total stock of appliances in service at any given -- for each year during that analysis period in order to estimate the corresponding national energy consumption of the stock and also the total installed cost and the total operating cost of that stock.

To get the per unit information for cost and energy, we'll be getting that from the life-cycle cost analysis, and then, again, we'll be aggregating that up to national values by using stock -- by coupling the stock with that.

We'll be reporting national energy savings in quads, or quadrillion Btus, or 10 to the 15th Btus, and we'll be also reporting that in source energy consumption. In the LCC we do things in terms of site energy consumption. For this part of the analysis we actually convert those energy savings into service energy savings using cited source conversion factors

that take into account losses in transmission and distribution, and in the case of electricity the efficiency of the power plant.

We're reporting our estimates of the economic impact with a national net present value, or NPV, and that will be expressed in dollars or billions of dollars.

And again, since we're calculating this annual time series of money, we'll be using discount rates to convert that to a present value.

This gives you a depiction of this flow diagram of how we intend to calculate the national energy savings. It starts out by using the shipments analysis to develop our base case shipments forecast and our standards case shipments forecast.

And again, looking at what we do in the base case, we calculate the annual energy consumption associated with the stock of appliances for every year from when the standard becomes effective out over this 30-year period. We get that per-unit annual energy consumption associated with each one of those stocks from the LCC analysis.

We do the exact same thing for the standards case to develop this standards case annual energy consumption for every year throughout the analysis

period.

And then we accumulate the base case energy consumption and the standards case energy consumption. Before we actually do that accumulation, we multiply them by the cite-to-source energy factors to get them into source energy consumption, and then we take the difference of the base case and the standards case to get national energy savings.

This is a similar flow diagram to show you how we're calculating net present value. Again, it's very, very similar. I'm not showing all those series of boxes for the energy cost, maintenance repair cost, and equipment cost, but just imagine those same sort of boxes going from the year that the standard becomes effective out over that 30-year period.

Again, we start with the shipments analysis that provides us with our base case and shipments case forecasts, and those are, again, used to develop the energy cost, the maintenance repair costs, and the equipment costs associated with the stock of appliances over this analysis period. We do that for both the base case -- that is, the case without standards -- and the standards cases.

We then accumulate the operating cost savings by looking at the difference in the energy,

maintenance, and repair costs for the base case versus the standards case, and we look at -- then we accumulate the total equipment costs and look at the difference there by comparing, again, the base case and the standards case.

We apply discount rates to these annual time series to get a present value, and we take the difference between the two to get a net present value. If the operating cost savings are greater than the equipment cost increases, we're getting a net benefit to the nation from the standard, but if it's the other way around -- that is, the equipment cost increases are greater than the operating cost savings -- we're getting a burden to the nation from the standard.

MR. GOLDSTEIN: David Goldstein, NRDC. I just wanted to reiterate that this is a very backhanded and approximate, meaning not very accurate, way of getting at the direct social benefit, which is calculating the number of power plants that don't have to be built and the number of other pieces of infrastructure that don't have to be built. That is clearly the benefit. On the cost side, you go to the manufacturer costs and the markups.

Putting the consumer in the middle of this when the consumer is dealing with a regulated pricing

system throughout the country whose future can't be predicted is a very error-laden and backhanded way at getting at what is a pretty simple calculation if you did it right.

MR. DeLASKI: This is Andrew DeLaski. I think have sort of a different way of saying what David just said, which is that you just said this gives you a way to calculate the cost and benefits to the nation. Well, I think it should weigh the cost and benefits to the people who buy and use the room air conditioners, which I think is a different thing.

Dave was making the point that there are costs and benefits that happen here that are to non-users of the equipment, and the Department historically just hasn't done a good job of capturing those costs and benefits in other rulemakings. This is an opportunity to -- in a rulemaking where you have to -- utility impacts, to capture those costs.

I'm not sure where it is in the analysis. You have the utility analysis. Typically we do -- you do calculate the impact on peak electricity use, which I think is valuable, but you don't monetize it. I think monetizing that is really important so that we do accomplish what you just said, which is what are the costs and benefits to the nation, not just what are the

costs and benefits to the people who happen to buy and use the particular products.

They're two questions. They're both important, but they're different and you shouldn't get them confused.

MR. BROOKMAN: Other comments related to this flow diagram before we move on to shipment-weighted efficiency and market share efficiency data?

(No response)

MR. ROSENQUIST: Okay. There are two important sets of efficiency data that are critical to doing the national impact analysis. The first are the shipment-weighted efficiency data, and again, this represents the average efficiency of shipments coming into the market for any given year.

What we do is we develop these shipment-weighted efficiency trends that we use to characterize what happens in the base case; that is, the case without standards. We essentially take the per-unit annual energy consumption data and annual cost data from the LCC analysis to calculate the national consumption and costs corresponding to those shipments coming into the marketplace.

What the market share efficiency data is used for is to figure out or help us try to figure out how

standards will impact that shipment-weighted efficiency trend that we have in the base case.

Again, this market share data is equivalent to these base case efficiency distributions that I was talking about earlier in the life-cycle cost analysis. They show the distribution of appliance efficiencies currently being purchased by consumers.

So what we'll do is we'll run these scenarios. For example, one of them is a roll-up scenario where we assume that all the products below a particular standard level will move up to that new standard level and then calculate a new shipment-weighted efficiency that results from the standard and then project that out into the future. So you essentially have now two efficiency trends, one for the base case and one for the standards case by conducting such scenario analyses.

Does anyone have any questions on that particular aspect of the analysis?

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: David Goldstein. I don't know whether this is a question or a comment. But for years DOE has done these projections of what would happen to the distribution above the standards level as if DOE had never set a standard before, and you hadn't

in many of those. But you have now, and there ought to be some pretty good historical information on what does happen after standards that would make this less speculative, although there's still obviously going to be some uncertainty.

MR. ROSENQUIST: Okay. This slide for clothes dryers shows the type of historical shipment-weighted efficiency data that we're hoping to obtain from stakeholders. Again, for clothes dryers we're only asking for it on the four vented product classes because the two vent-less product classes, they're currently not being tested for efficiency. So we're just assuming that that data doesn't exist. But if you do have any data that would give us any insight as to what the vent-less shipment-weighted efficiencies are, we certainly would love to have that.

This slide shows you the historical efficiency data we're looking for for room air conditioners. This just emphasizes the fact that we're looking for shipment-weighted efficiency data for all 16 product classes.

So back to looking for input from stakeholders on -- to repeat, just looking for that historical shipment-weighted efficiency data, hoping to get that for both, again, clothes dryers and room air

conditioners. And we're also looking for any input on our approach that we plan to use to conduct the national impact analysis and develop national energy savings and national net present value.

MR. BROOKMAN: So, any additional comments on this approach, what's being suggested here? Dave Calabrese.

MR. CALABRESE: From an AHAM standpoint, as I said before, we'll be collecting data. I'm not sure how far back we can go. We'll go as far back as we can. There's a request here back to '93. I mean, we always endeavor to go back as far as we can. I think in previous years we've gone back five years or so, whatever is out there. So we'll do what we can.

MR. BROOKMAN: Thank you. Do we have comments on additional data sources for historical shipments or historical efficiency, I should say?

(No response)

MR. BROOKMAN: No? Okay. So let's do one more here.

MR. ROSENQUIST: Okay. You want to?

MR. BROOKMAN: Yeah.

MR. ROSENQUIST: Okay. Now we're heading for the next agenda item, which is the NOPR analysis. Now, we're leaving the ANOPR analysis and entering into --

MR. BROOKMAN: Why don't we take a break?

MR. ROSENQUIST: Yeah, I think this is a good point for a break.

MR. BROOKMAN: Let's take a break. It's 2:31 by my watch. So let's return at 2:45 and resume.

(Brief recess)

MR. BROOKMAN: Okay. So now we are on Slide 103 and back to Greg Rosenquist.

Life-Cycle Subgroup Analysis

Gregory Rosenquist

(PowerPoint presentation)

MR. ROSENQUIST: Okay. So I'll start with -- what I'll be starting off with is a discussion of the analyses that we plan to conduct for the NOPR. So these are analyses that we won't be conducting for probably on the order of a year to a year and a half.

I'm returning to a slide that was presented in the introduction showing what analyses are conducted for the NOPR. What's done there is that there is a revision to the ANOPR analyses based upon stakeholder input and comments, and then, in addition to that, we conduct the life-cycle cost subgroup, manufacturer impact, utility impact, environmental -- employment impact, environmental impact, and regulatory impact analyses.

Now, the first one I'm going to touch on here is the life-cycle cost subgroup analysis. The purpose here is to determine if there's any subset of consumers who may be disproportionately impacted by efficiency standards. The way we do this is by extending or applying the LCC analysis to the general population, to those particular subset of consumers that we want to look at.

In the past we've typically looked at the low-income subpopulation or seniors, for example. So we're looking for any input from stakeholders on what particular subgroups you think we should be looking at for room air conditioner and clothes dryer consumers.

MR. BROOKMAN: Yes, David.

MR. GOLDSTEIN: David Goldstein, NRDC. I just wanted to preface this by saying I'm trying to bring up a lot of important and difficult issues now because it's early in the process and it's going to give the Department and its contractors the longest amount of time to figure out how to deal with them.

But there are some very significant groups that may have specific impacts that I want to bring up. The first one is non-users, people who don't buy air conditioners or clothes dryers, and they're affected by a standards decision in two different ways.

One of them is the way that we've discussed extensively in the furnace proceeding, and the Department has agreed with us, as well as the transformer proceeding, which is that when we save natural gas directly through a gas dryer or indirectly through an electric appliance, we are reducing price pressures on natural gas. Natural gas is very price-sensitive to demand, so the effect is big. So some of the biggest beneficiaries of standards could be industrial firms that have to buy natural gas or low-income consumers who are paying lower or higher utility bills depending on what decision the Department makes.

And then secondly, as I mentioned before, because of the immense cost subsidies involved in highly peaked energy use in air conditioners, non-users of central air conditioners would be affected in an additional way beyond the natural gas effect.

I would suggest you divide this up into a low-income subclass of non-users. I suggest that you look at renters as a separate class because renters can't choose the efficiency of their appliances or the other elements of their house. I think you should look at states that have pollution restrictions such as California's AB32 or the northeast states with REGI, where there are effectively going to be fees for carbon

emission and someone is going to pay them, and they're going to pay less if DOE makes one decision on standards for these two appliances than they would if it makes a different kind of decision.

MR. BROOKMAN: Thank you. Other comments on subgroups that would be, I guess, used or disproportionately affected?

(No response)

MR. BROOKMAN: No additional comments. Okay.

MR. ROSENQUIST: Next up is Constantin von Wentzel to talk about the manufacturer impact analysis.

Manufacturer Impact Analysis

Constantin von Wentzel

(PowerPoint presentation)

MR. von WENTZEL: So in the NOPR phase we have another manufacturer impact analysis which differs primarily from the MIA in the ANOPR phase that it's qualitative and quantitative whereas the ANOPR MIA is typically more qualitative.

As you can see here, the idea is to assess the impacts of standards on manufacturers, identify any subgroup of manufacturers that might be impacted more than others because, let's say, they're more concentrated in a particular space, look at the cumulative regulatory burden on the industry, and then

also construct the government regulatory impact model, or GRIM.

As you can see here, the second MIA consists of phases two and three. So where we've developed an industry profile and conducted preliminary MIA interviews in the ANOPR phase, in the subsequent two phases we develop the straw-man GRIM, the second interview guide, where we confirm our assumptions and conduct those interviews, and then assess employment, competition, and cumulative burden.

So here are the specific steps in their detail. The idea is to basically calculate the impact on the industry as a whole of standards such that we can assess the change in net present value as a function of efficiency standards being proposed. So we look at, for instance, the impact on manufacturer prices, the shipments, the capital expenditures, the research and development costs, marketing costs, and our sources of information for that are 10Ks, manufacturer's interviews in the ANOPR phase, and the cost models we develop as a result of our tear-downs.

In the interview guide you can see we have a number of topics, and each of these topics typically has at least five or six questions. So there's a lot of information that we ask for.

In the third phase we go through the interviews, and the idea is that we have these confidential discussions with manufacturers such that we can aggregate the data and show it to all stakeholders without divulging any confidential information. Here the question becomes one of how much money the industry will have to spend to achieve certain efficiency levels and then, if there are smaller manufacturers who are manufacturers that are disproportionately impacted, to identify such manufacturers and the issues that they face.

Naturally, if standards are projected to have an impact on things like employment levels, factory presence in the United States, so on and so forth, we try to capture that as well.

Lastly, there is the issue of the cumulative regulatory burden. We've already identified the CFC and HCFC phase-out by 2010. Some other standards also affect manufacturers in this phase, particularly the ones who are more diversified. If they are exporting to the EU or to China, then you might also be subject to the reduction of hazardous substances.

So we try to capture all of those impacts and report them for all stakeholders to comment on and for DOE to make a decision with.

So our questions or our request for comment -- Doug, do you want to read this?

MR. BROOKMAN: We'll just read it into the record.

MR. von WENTZEL: Read it for the record?

MR. BROOKMAN: Yeah. Into the record.

MR. von WENTZEL: Okay.

MR. BROOKMAN: Why don't you go ahead?

MR. von WENTZEL: Okay. DOE would welcome comment on what potential manufacturer subgroups for residential clothes dryers and room air conditioners it should consider in a manufacturer subgroup analysis.

MR. BROOKMAN: Let's stop there. Comments on this question? There's a whole lot of content here. So let's -- anybody that has comment related to this cluster of issues?

(No response)

MR. von WENTZEL: No? I guess --

MR. BROOKMAN: Not at this point. Okay.

MR. von WENTZEL: No comment?

MR. BROOKMAN: Yeah.

MR. von WENTZEL: And DOE welcomes comment on whether there are other regulations or pending regulations that it should consider in its examination of cumulative regulatory burden. I believe, Phil, that

would be speaking to your point about the UL clothes dryer fire standard. Any other comments?

MR. SACHS: Harvey Sachs, ACEEE. I'm not sure if the detail's requirements are adequate to cover this, but to me it seems that cumulative regulatory burden includes the cumulative regulatory burden on stakeholders beyond the manufacturers of the equipment. In particular, it includes the burdens, if such that they be considered, on utilities who are attempting to deliver efficiency to their customers.

MR. BROOKMAN: Thank you. J.B.

MR. HOYT: J.B. Hoyt, Whirlpool. You mentioned in the framework document the clothes washer standard that took effect January 1, 2004. It's appropriate. I remind the Department that it's the second one that took effect January 1 of 2007, which is another burden.

We are in the process of looking at additional standards in both clothes washers and dishwashers, as well as changes to Energy Star levels for those products, along with refrigerators, and the prospect of a refrigerator rulemaking, which would impact many of us who are multiproduct manufacturers. So those are potential -- some are scheduled and some are potential future burdens that are expected.

MR. BROOKMAN: Thank you. Yes, Harvey Sachs.

MR. SACHS: Dave, you were out of the room a minute or so ago, but the question really is to Dave Calabrese whether he would feel comfortable identifying manufacturer subgroups who might be differentially impacted under the regulatory burden criteria.

This is sort of a heads up. It's not a data request or anything.

MR. CALABRESE: I appreciate that. At this point we don't have -- I don't have that information. I don't have any input for you, but you know, we'll be considering more comments coming up. I mean, in other rulemakings and other product categories there have been such subgroups, and at this point what we don't have -- I don't think we have that -- I don't think we have that situation right now.

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: Yeah. Just a suggestion. This is more for the policy decision-makers rather than the analysts. Cumulative regulatory effects are interesting are relevant here. The word "burden" suggests that this is a bad thing and a reason not to go with a stronger standard.

I'm concerned of a structure of decision-making in which doing something is a reason not to do a

standard and not doing it is also a reason not to do a standard. I'm referring in specific to the EU directive. I can easily see how an EU standard could be a burden on manufacturers.

I could also equally easily see how an argument could be made, well, this is the only country that's regulating this. The EU doesn't do anything. That's the reason why we shouldn't do a standard. If the same -- if going this way is bad and going the opposite way is also bad, then you've got a flawed decision-making structure.

MR. BROOKMAN: J.B.

MR. HOYT: I would point out that the phrase "burden" has been used to represent the impact on us as manufacturers and the cost of doing multiple things that are not demanded by the marketplace does place a demand on our companies and a burden on our ability to do other things that might be more desired by our consumers and/or our stockholders. As public companies, which many of us are, I think in that regard it is potentially a burden.

MR. BROOKMAN: Okay. Additional comments on what is characterized here as cumulative regulatory burden?

(No response)

MR. von WENTZEL: Okay. In that case, on to the utility impact analysis.

MR. BROOKMAN: Greg Rosenquist.

Utility Impact Analysis, Employment Impact Analysis, Environmental Assessment, and Regulatory Impact Analysis

Gregory Rosenquist

(PowerPoint presentation)

MR. ROSENQUIST: Yes. Back again. Hello, everyone. I'll be covering now the rest of the analyses that are in the notice of proposed rulemaking, starting with the utility impact analysis. The purpose of this is to determine the impacts from standards on domestic energy suppliers. In other words, electric and gas utilities.

The method that we've used in the past and that we plan to use in the future is to use the National Energy Modeling System, or NEMS. NEMS is used to develop the forecast that you see in the Annual Energy Outlook. Again, it's the basis that we'll use to conduct our utility impact analysis.

Some of the outputs out of the Annual Energy Outlook include forecasts of electricity and gas sales, electricity and gas prices, and for electric utilities, avoided generation -- generation capacity.

So what we'll be doing in this analysis is inputting the national energy savings we get from the national impact analysis into NEMS to see what sort of effect standards have on these various qualities. That is, the electricity and gas sales, the prices, and the installed generation capacity.

MR. BROOKMAN: So there you see the request for comments. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Does NEMS also have information about avoided gas production from reduced gas usage from products?

MR. ROSENQUIST: In the form of reduced sales of gas.

MR. ROSENSTOCK: But how about capacity -- you know, avoided new wells or avoided imports of natural gas?

MR. ROSENQUIST: Well, the imports I believe would be captured. I mean, sales coming from, you know, non-domestic sources, that would be captured. But if you're alluding to the capacity like pipelines and things like that, no.

MR. BROOKMAN: Okay. Yes. Harvey.

MR. SACHS: I guess I'm getting old, but over the years what's struck me about NEMS has been two attributes. One of them is it's volatile. Life-cycle

cost estimates, again for the furnace and boiler rating -- rulemaking recently changed by 20 percent depending on whether you used the 2006 or 2007 NEMS.

So I would -- well, the second attribute has been that it's had a great deal of difficulty, had to use exogenous inputs for the future cost of emerging technologies, which would include the products under discussion here.

For these two reasons I think it's important to ask you all how NEMS works as a backcasting method. We certainly can't ask for standard deviations on our forecasts, but we can ask how NEMS has done in the past and why it should be trusted now. I don't have the answers, but I think that's an important part of the process of understanding the limitations for analyses.

MR. BROOKMAN: Thank you.

MR. ROSENQUIST: Okay. If there's no other comment I'll move on to the --

MR. SACHS: Wait a minute, Greg. Are you going to do it?

MR. BROOKMAN: So then, moving on.

MR. ROSENQUIST: Well, let me try to address it. I was trying to avoid it.

(Laughter)

MR. ROSENQUIST: Basically, it's no secret

that if you look at past, for example, price forecasts that come out of NEMS and what's published in the Annual Energy Outlook, like Harvey has said, they have been volatile and they haven't always been on the mark in terms of forecasting energy prices in the near term.

With that said, though, it is the federal government's national energy model for determining what happens in the energy sector throughout our economy. So I don't know what else to say besides that other than, you know, they have a large team over there at EIA trying to deal with this stuff and we're trusting that they're producing a model that will give us decent forecasts of the type of things we're looking at.

MR. BROOKMAN: Employment Impact Analysis.

MR. ROSENQUIST: Okay. What we do in the employment impact analysis is to assess the overall impact on employment in the U.S. from the efficiency standards. We determined two impacts, a direct impact on those manufacturers or those service industries for the particular appliances that we're looking at, and that's done in the manufacturer impact analysis.

And we also calculate the indirect impacts resulting from shifts in how consumers spend their money on goods and services as a result of having increases in these appliances caused by standards and

decreases in the amount of money they spend on energy.

The model that we use is an input/output model that's been developed by Pacific Northwest National Laboratory. Its name is ImSET. It stands for Impact of Sector Energy Technologies. We've used versions of those model in previous rulemakings. In those cases it was called the ImBUILD.

So now we're looking for comment on this approach to use ImSET to do the indirect employment impacts analysis.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I'm just going to kind of put this for room air conditioners. What I heard -- it sounded like most of them are manufactured overseas at this point these days. If all the manufacturing is overseas, how does this model -- does this model address overseas manufacturing?

I'll throw out a number. Suppose if 80 percent of the room air conditioners are manufactured overseas, how does this model handle that?

MR. ROSENQUIST: Well, this model is only analyzing the indirect impacts. So how consumers will change their spending behavior based upon, you know, increases in the appliance price and changes in energy

cost, that issue will be handled in the manufacturer impact analysis.

MR. BROOKMAN: However, the Department does request comments both on the direct and indirect effects or impacts. So if anybody has any additional comments that way, that would be helpful.

(No response)

MR. BROOKMAN: No additional comments on that. Okay.

MR. ROSENQUIST: Okay. Moving on to the environmental assessment. The purpose of this analysis is to calculate the environmental impacts for moving to higher efficiency standards. Again, we're going to be -- plan to use the same model that we plan to use in the utility impact analysis, which is NEMS, or National Energy Modeling System.

Outputs of NEMS include forecast of CO2 emissions from power plants, SO2 emissions, NOx and mercury emissions.

So what we'll do is, again, implement the energy savings that we calculate from the national impact analysis into NEMS to see how each of those emissions from the power plants are affected.

Now, there's existing legislation that currently caps SO2 emissions, and there's recent

rulemakings that have been passed by the EPA that basically cap the emissions of NOx and mercury. So for all intents and purposes, the only emissions that will be impacted from power plants by appliance standards will be CO2.

Now, we'll have to carry out a separate analysis of in-house emissions because NEMS doesn't address those particular emissions. So we'll be looking through the literature and developing emission factors to apply to the energy savings that we calculate for gas dryers to get the impacts on in-house emissions of SO2, NOx, and carbon, CO2.

So, are there any other environmental factors that you think the Department should be looking at in this rulemaking and do you think there's any other approaches that we should use for doing the environmental assessment?

MR. BROOKMAN: David Goldstein.

MR. GOLDSTEIN: David Goldstein, NRDC. I have two suggestions, one analytic and one policy decision-making. They start off with where you're going. I think the quality of the analysis plan is good as far as it goes. Where it stops is monetization of the value of the benefits. You need to monetize the CO2 benefits. That should be pretty easy to do now

that there are starting to be markets throughout the world in trading CO2.

You need to monetize the economic benefits of making it easier to meet the other capped pollutants that are capped by other legislation because by doing it through efficiency you're requiring less through the more expensive kinds of controls.

A second suggestion concerns decision making. DOE is supposed to consider environmental impacts as part of its establishing legislation. Every final rule I've ever read has done a recitation of environmental impacts and there's no logical train to suggest that it has influenced the decision-making in any way, shape, or form.

That would be particularly a problem with this administration now because in the past couple weeks the White House has stated that they would oppose mandatory caps on greenhouse gas emissions because they could accomplish reductions in greenhouse gas emissions through other policies such as appliance efficiency standards.

It seems to me if you're to take that statement with any grain of directness, it would have to mean that appliance efficiency standards will be set differently because of the desire to constrain carbon

emissions than they would have been had carbon not been a factor.

So monetization is perhaps one way that that can be directly incorporated into the decision-making, but I would expect and hope that there would be some other, more qualitative ways that the environmental effects could be incorporated into decision-making so that we can follow through on this commitment that's already been made at a higher level than the decision-makers who are going to be deciding on this rule here in DOE.

MR. BROOKMAN: Thank you. Harvey Sachs? No? Okay. Other comments related to this slide on environmental assessment, particularly the impacts? Steve Rosenstock.

MR. ROSENSTOCK: Or Mr. Steve Sachs, whichever you prefer, Harvey.

(Laughter)

MR. ROSENSTOCK: Again, this analysis -- the environmental analysis, there are CO2 markets in Europe. The price has fluctuated quite dramatically because of the way they've been allocated and trying to monetize when you have fluctuating prices for anything in a market is going to be -- could be rather difficult, especially when you're trying to project.

The other thing is that if there is cap and trade legislation in the U.S. over the next couple years, it would go into effect before 2014, I would guess. You might be in the same situation as your analysis for the other emissions that you're referring to in that. Since they're capped, I don't know how you might -- you might be -- might have to take the same modeling approach. Thank you.

MR. BROOKMAN: Thank you. Harvey Sachs. I knew I could count on Harvey.

MR. SACHS: I think the other obvious environmental factor to be considered as we move is the environmental impact of water-cooled condensing dryers. To the extent that they do have market share, they will represent an impact on water use and that's a commodity of increasing value in most parts of the country, even Virginia.

MR. ROSENQUIST: Okay. Finally, the last analysis step for the NOPR, the regulatory impact analysis. The purpose here is to explore alternatives, non-regulatory alternatives to mandatory efficiency standards. The types of things we typically look at here are voluntary standards, things like Energy Star, tax credits, and other things like that.

We'll be trying to base the savings that we

determine for these non-regulatory alternatives on past historical data to give us an indication again of how those particular programs impact the market. Again, we'll be comparing that to the savings that we calculate from our mandatory efficiency standards.

There's not a comment slide for the RIA, but we certainly would like to hear if you have any comments on this particular aspect of the analysis.

MR. BROOKMAN: Yes, definitely. Comments on regulatory impact analysis? Yes, Dave Calabrese.

MR. CALABRESE: From the industry standpoint, you know, we see these voluntary initiatives, market pull, market push initiatives, as having great effect and should be taken very seriously. There are tax credits that my friend David Goldstein is a supporter of and that we have agreed to that are pending in the Congress right now and are in effect. They've had a dramatic effect on the industry. Unfortunately, they don't have -- for these products they're not applicable.

But these voluntary initiatives, Energy Star and other voluntary incentives, provide a great effect and we have always felt, and will continue to say so, that while there is a place for standards, the voluntary initiatives have a very important aspect. In

fact, as you develop your models, and you mentioned this earlier, providing -- showing that there may be significant market share at various efficiencies will, I think, effectively demonstrate what the true energy savings would be from a new standard, not just looking at what's the baseline but realizing there's stuff at the baseline, there's going to be product at the Energy Star level, and sometimes even beyond because of these tax credits. Thank you.

MR. BROOKMAN: Thank you. Other comments related to the regulatory impact analysis?

MR. GOLDSTEIN: David Goldstein. I agree with what Mr. Calabrese just said on the effectiveness of programs like Energy Star. Other market transformation efforts are much more problematic for these two products than they are for almost anything else, tax credits, utility programs, and so on, because these are discretionary products. One can argue about whether we're better off or worse off with more of them being sold, but in terms of energy use, more of them sold will mean more energy use at the range of efficiency improvements that we're talking about being technologically reasonable here.

So you really are limited to very creatively designed incentive programs or recognition programs

like Energy Star and standards much more than you would be for the other products covered by DOE.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Just in terms of data points, again, you know, the federal government has had their tax credits in effect for the last couple of years on appliances. I don't know if the IRS has data, but you know, people -- to get tax credits, taxpayers had to fill out forms to get the tax credit. So the IRS might have some data points in terms of -- especially for the appliances, the HVAC appliances and water heating appliances that were eligible for federal tax credits. It might be an interesting data point to use in your analysis.

Also, I know certain states also had like sales tax holidays on Energy Star appliances in October. Virginia was one of them. In combination with the manufacturer tax credits, I don't know if there's any data from state governments. I know Virginia did it earlier this month. I think Georgia did it as well. There might be some data at the state level.

MR. BROOKMAN: Thank you. Other comments on regulatory impact analysis?

(No response)

MR. BROOKMAN: Okay. I think that then is it for you, Greg. Thanks very much, Greg. Let me take the initiative to thank all the presenters today.

This is the occasion now when the Department wanted to provide yet another opportunity for anybody that wishes to make closing remarks to emphasize an issue or two. Right now is your opportunity to do that.

Phil.

Other Issues and Comments/Closing Remarks

MR. MANTHEI: Phil Manthei, Alliance Laundry Systems. I want to thank the Department for the nice presentation materials and the overhead slides. I'll be presenting them in our company. Of course, we're more focused on the commercial laundry aspects and so it's interesting. We'll have to go back and make sure everybody is up to speed with some of the new people that are in place with residential products. It helps when you have good materials that they can use and refer back to. Thank you.

MR. BROOKMAN: Thank you. David Goldstein.

MR. GOLDSTEIN: David Goldstein, NRDC. I wanted to thank the Department and its contractors for getting this kicked off and going in the right direction.

MR. BROOKMAN: Thank you. Dave Calabrese.

MR. CALABRESE: I want as well to echo the thanks for this very thorough job. Again, I think that while we have some disagreements over some issues, I think it shows the Department is really taking this very seriously and looking at the issues in a thorough way.

MR. BROOKMAN: Thank you. Yes, Harvey Sachs.

MR. SACHS: Harvey Sachs, ACEEE. I also would join with everyone else in thanking the Department, the presenters, and our professional colleagues around the table and in the room for the seriousness. I guess I'd say that you've outlined a daunting series of steps and trust the Department will be open to thinking about alternative means of converging on standards as well.

MR. BROOKMAN: Phil, did you have something else you wanted to say? No? Okay. Any other comments here before we move towards closure?

(No response)

MR. BROOKMAN: So then, I would ask you, the last page of your packet is an evaluation form. So if you'd take a peek at that. It only takes a minute or two to fill it out. The Department reads them carefully. Please fill them out.

And then from my perspective, the last thing I would say is I just thank all of you for the cooperative spirit in the room, for the level of disclosure and good humor, and many thanks to all of you for staying on time and making this an effective meeting.

And then I'll turn it back to Steve Witkowski for closing remarks.

MR. WITKOWSKI: I just want to thank all of you for coming today and for helping us in this process. I look forward to working with all of you in the future. We really are looking forward to as much input, to new ideas, to whatever you have to help us in this process.

The last page, on page 127 of the slides, also I believe on page 9. Again, a reminder on how to submit written comments. All the information is on this slide. The comment period closes on November 6th, so please, if you have comments, get them in and get them in to us on time if you can.

Additionally, in the Federal Register notice, my contact information is there. Don't hesitate to contact me either by telephone or e-mail if you have any questions or any other issues you want to discuss. I'll also be sure that they're passed on to the rest

of the members of the team.

And again, Doug, thank you very much. I want to thank all the people who helped put this together and everyone who came, and let's hope that we have a successful rulemaking here. Thank you.

(Whereupon, at 3:25 p.m., the meeting was concluded.)