U.S. DEPARTMENT OF ENERGY
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ENERGY CONSERVATION STANDARDS FOR
RESIDENTIAL DEHUMIDIFIERS

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PUBLIC MEETING

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MONDAY
SEPTEMBER 24, 2012
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The meeting was held in the Forrestal Building, Room 8E-089, 1000 Independence Avenue, S.W., Washington, D.C., at 1:00 p.m, Doug Brookman, Facilitator, presiding.

PRESENT:
DOUG BROOKMAN, Facilitator, Public Solutions, Inc.
BETSY KOHL, Department of Energy
STEPHEN WITKOWSKI, Department of Energy

ALSO PRESENT:

BEN BARRINGTON, Navigant Consulting, Inc.
DONALD BRUNDAGE, Southern Company
KEVIN CHURCHILL, Intertek
JENNIFER CLEARY, Association of Home Appliance Manufacturers
CAMILLA DUNHAM WHITEHEAD, Lawrence Berkeley National Laboratory
JULIA FARBER, UL LLC
AMANDA GONZALEZ, Energy Solutions
MAITHILI IYER, Lawrence Berkeley National Laboratory
ANDREW JEAN-LOUIS, Navigant Consulting, Inc.

STEVE LEYBOURN, Association of Home Appliance Manufacturers
JOANNA MAUER, Appliance Standards Awareness Project
MARK MENZER, Intertek
CHUN CHUN NI, Lawrence Berkeley National Laboratory
TERESA PECK, Intertek
JUDITH REICH, Navigant Consulting, Inc.
NADAV SINGERMAN, Navigant Consulting, Inc.
LOUIS STARR, Northwest Energy Efficiency Alliance
TIMOTHY SUTHERLAND, Navigant Consulting, Inc.
TROY WATSON, Navigant Consulting, Inc.
MEG WALTNER, Natural Resources Defense Council
TIMOTHY LONG, Lawrence Berkeley National Laboratory

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P-R-O-C-E-E-D-I-N-G-S

(1:03 p.m.)

FACILITATOR BROOKMAN: Let's do start. Welcome, everybody. This is the U.S. Department of Energy's public meeting on energy conservation standards for residential dehumidifiers.

Today is Monday, September 24th, here in the Forrestal Building in Washington, D.C. A beautiful day in Washington, by the way.

My name is Doug Brookman from Public Solutions in Baltimore. Glad to have you with us. We will start this afternoon with brief welcoming remarks from Stephen Witkowski.

MR. WITKOWSKI: Hello, everyone. Welcome or welcome back. I'll make this very brief, since we have a lot of information to cover quickly.

But basically, we will present our methodology for conducting the energy

conservation standards rulemaking for residential dehumidifiers this afternoon. And this being a framework document meeting, we are primarily interested in seeking input and information and data and your comments on our methodologies.

So with that, thank you for coming, and let's start.

FACILITATOR BROOKMAN: Okay. We typically start off these meetings by doing introductions around the room. I'm going to start here to my immediate left. And if you would start by saying your name and organizational affiliation. It gives you a chance to get used to turning these microphones on and off as well. Please.

MS. FARBER: Julia Farber with Underwriters Laboratories.

FACILITATOR BROOKMAN: Okay. Excuse me one second. Brenda asked me at the outset -- the Department -- I apologize for interrupting. The Department makes a

photocopy of the business cards of those that are here present, and if you were at the meeting this morning, then we do not have a copy of that business card.

So if you could hand a business card to Brenda as she walks around, then the Department will have a more complete record of who is here today. So thanks for doing that.

Now, please.

MS. FARBER: Okay. Still Julia Farber from UL. Thanks.

MR. BRUNDAGE: Don Brundage, Southern Company Electric Utility.

MS. WALTNER: Meg Walter, the Natural Resources Defense Council.

MS. MAUER: Joanna Mauer, Appliance Standards Awareness Project.

MS. GONZALEZ: Amanda Gonzalez with Energy Solutions on behalf of the California Investor-Owned Utilities.

MS. CLEARY: Jennifer Cleary with the Association of Home Appliance

Manufacturers.

MR. CHURCHILL: Kevin Churchill with Intertek.

MR. MENZER: Mark Menzer with Intertek.

MS. KOHL: Betsy Kohl, DOE GC.

MR. WITKOWSKI: Steve Witkowski, U.S. DOE.

FACILITATOR BROOKMAN: Will you please stand up? We'll go around the room. No need for a microphone here. Just project.

(Whereupon, introductions were made from off-mic locations.)

Okay. Thanks to all of you.

I would note we have some additional seats at the table. If you expect to be making comments during the course of the meeting today, please feel free to come up and join us here on the front row.

All of you received a packet of information when you came into the room today. I'm going to do a very brief agenda review.

You can see immediately following these opening remarks and agenda review there is a -- we will have a rulemaking introduction and background.

Prior to that, after the agenda review in fact, there is an opportunity for anybody that wishes to do so to make opening statements and opening remarks about issues that matter to you.

Immediately following the rulemaking introduction and background, we will move to a description of the test procedure, market and technology assessment, screening analysis, and engineering analysis, and following that preliminary and NOPR manufacturer impact analysis.

We will take a break mid-afternoon as useful. And following that, an overview of markups for equipment price determination, energy use determination, life-cycle cost and payback period analyses -- analysis, shipments analysis, national impact analysis, LCC

subgroup, utility, employment, emissions, and regulatory impact analyses -- plural.

And at the end of the day today, around about 3:45 or so, there is another opportunity for anybody that wants to to make an additional comment, raise any other issues that you think are important at this point in the proceeding.

So that's the plan for today. Questions and comments?

(No response.)

I see none. All of you received this packet of information. This will be the basis upon which we will both review information and offer comment today. The Department has a lot of information in these colorful slides, and they also in here have -- if you look through it, they have callout boxes, comment boxes, where they ask for specific information to come from those of you here present. We hope that you can respond to those.

So questions or comments on any of that?

(No response.)

I would ask for your consideration, please, today. Speak one at a time. Please say your name for the record each time you speak. We typically have individuals now joining us via the web. Yes? How many do we have joining? Eight. Can you -- we should probably have those individuals identify themselves. Can you bring that microphone over and just read their names into the record?

PARTICIPANT: Online we have Brian Daugherty, Charlie Stevens, Kurt Trammell, Daniel Young, Linda Wilson, Michael Woodford, Renata Mortazavi, and Yolanda Williams.

FACILITATOR BROOKMAN: Thank you, Emily. Appreciate that. And for those of you joining us online, the Department of Energy is trying hard to make these meetings accessible to everyone via the web.

Please turn your microphones or your telephones on mute, so you won't cause feedback to our system here in the room, and also please feel free to raise your hand to ask a question or deliver a comment during the course of the proceedings today.

Finally, if we could -- everybody could silent their cell phones, and let's keep the comment as targeted and focused as possible. There is quite a bit of content here, and we will try and get through it as expeditiously as possible.

Questions and comments before we proceed?

(No response.)

I see none. So, Stephen, I was thinking we would do opening remarks, if there are any, right now.

MR. WITKOWSKI: Sure.

FACILITATOR BROOKMAN: Yes. Are there any comments here at the outset surrounding issues that matter to you?

(No response.)

I see none. Then, let's proceed. Are you going to start off? First, we will hear from Judith Reich.

MS. REICH: Okay. Well, good afternoon, everybody. It is a pleasure to be here and talking about DOE embarking on this new dehumidifier rulemaking. Thanks to everybody who has continued on from this morning.

Let's see. I'm going to start off by -- this is Judith Reich from Navigant -- give a little bit of the introduction and background. Obviously, we are here for the framework document public meeting, really encouraging everybody to provide as much information and data as possible. Welcome all comments.

As you have seen from the previous meeting, the request for comment will be indicated by these green boxes, and the numbers in those boxes you can refer back to

the framework document for the appropriate sections.

Again, the instructions for submitting comments -- what I'd like to point out is that the comment period closes October 17th, which was an extension from the original date that was indicated for the framework document. So October 17th for written comments.

A quick background -- the original standards for dehumidifiers were established in EPACT 2005, and those applied to dehumidifiers manufactured after October 1, 2007. EISA, the Energy Independence and Security Act, amended EPCA to establish new standards that will go into effect in -- a week from now, October 1, 2012.

Those were codified -- although EISA came out in 2007, they were codified in 2009. So the reason that we are initiating this rulemaking is that DOE is required under EPCA to publish a notice of proposed

rulemaking no later than six years after that previous final rule. So this rulemaking will meet that requirement.

I thought it would be a good idea to quickly remind everybody of the current and upcoming standards. It would be useful to point out that the 2012 standards not only are creating more stringent standards in terms of the regulated metric of energy factor, which is defined as the liters of moisture removed per kilowatt hour.

Those are becoming more stringent, but I also want to point out that the product classes have been disaggregated a little differently. And that is that the original product classes 1 and 2, the less than 25 pints per day, and the 25 to 35 pints per day, have been consolidated into a single product class.

And the original product class 3, which was the 35 to 54 pints per day, has been split into a 35 to 45 and a 45 to 54. And I

think that was, you know, in recognition of the types of products that are currently available.

This is a timeline for how this rulemaking is anticipated to proceed. We are here at the green box, the framework document. DOE expects to make the preliminary analysis available in early 2014 with the target of first quarter 2015 for the NOPR and a final rule sometime around 2016.

I also want to point out that it is actually -- there is an update to this last bullet point, because since this presentation went to press the test procedure -- amended test procedure actually has been issued, and this addresses standby and off mode and certain active mode updates.

Again, EPCA requires the rulemaking to demonstrate technological feasibility and economic justification for new standards, and these are the analyses that correspond to the demonstration of

technological feasibility, and, as everybody is well aware, the seven factors that must be considered.

So talking a little bit more about the dehumidifier test procedure, the current test procedure is denoted as Appendix X in Title 10 of the Code of Federal Regulations at Part 430, Subpart B.

And this was originally specified -- the requirement originally specified in EPCA is that the test procedure measures two parameters -- the capacity, which is used to establish the product class, and energy factor.

And it actually referenced a previous Energy Star requirement, qualification criteria, which in turn made reference to these two standards -- the ANSI/AHAM DH-1 to measure capacity in the pints of moisture removed per day, and a Canadian standard, CAN/CSA C749-94. And that is calculating energy factor in terms of

liters of moisture removed per kilowatt hour.

DOE recently conducted its rulemaking for standby mode and off mode energy use in the dehumidifier test procedure to meet the requirements of EISA 2007. And that required DOE to amend the test procedures for certain residential products, which included dehumidifiers, to include measures of standby mode and off mode energy use, if technologically feasible and if the test procedure didn't already include measures of those.

So some of the background was that in 2010 DOE published a NOPR, and it proposed to reference the international standard for measuring standby power, which is IEC 62301. At the time, that was a first edition of the IEC method, and it was recognized that IEC was in the process of updating that. And with support of commenters, DOE published a supplemental NOPR to reference the second edition of IEC 62301.

So, again, this is -- since this was put together, that amendment has been made to the test procedure to include measures from IEC 62301 for measuring standby mode and off mode power.

In addition, that rulemaking updated the active mode part of the test procedure, so that rather than indirectly referencing those two external standards for -- each one measuring a different parameter, it is now measuring both energy factor and capacity according to the current ANSI/AHAM DH-1, which is 2008.

So that amendment has been -- the rule has been issued. It establishes a new appendix called Appendix X1 that will have the standby mode and off mode energy use and the new DH-1, and X1 will be required to be used on the compliance date of standards that are being addressed in this standards rulemaking.

Okay. So the next portion of the discussion are covering the various analyses

that DOE will conduct at the preliminary stage of this rulemaking. And I will be talking about the first few pieces of it indicated in this flowchart, starting with the market and technology assessment.

MS. MAUER: Judy, I have a comment on the test procedure. Would now be a good time to --

MS. REICH: Oh, yes. I'm sorry.

FACILITATOR BROOKMAN: Joanna Mauer. Go ahead.

MS. MAUER: Thank you. So we are concerned that the active mode test procedure for dehumidifiers doesn't reflect actual field performance. A recent study that Cadmus conducted, a field monitoring study of dehumidifiers, found that for most of the units in their sample the measured energy factor was significantly lower than the rated value.

And they attributed this, at least in part, to lower ambient temperatures and

lower relative humidity levels in the field compared to the rating conditions. And I don't think this is a surprising result.

We know from RECS that of the homes that have -- that use dehumidifiers, 75 percent of those homes have basements, which suggests that most dehumidifiers are used in basements. And I think typical basement temperatures are certainly lower than 80 degrees Fahrenheit.

And then, regarding the relative humidity rating condition, I think 60 percent relative humidity probably represents really kind of the upper bound of what is recommended in terms of relative humidity levels. And the Cadmus study found that the average setpoint of the dehumidifiers in their sample was closer to 50 percent relative humidity.

And then, another study that was recently conducted by NREL, they tested six different dehumidifiers, and they measured energy factor over a fairly wide range of

ambient temperatures and relative humidity levels.

And their test results showed that some dehumidifiers maintained performance better than others over a wide range of ambient conditions, especially when you get down to lower ambient temperatures and relative humidity levels that are probably more reflective of what we see in the field for where dehumidifiers are operated.

And so I think this suggests that not only does the current test procedure not adequately represent field performance, but that the current test procedure also doesn't necessarily give a good indication of relative performance among units in the field at real-world operating conditions.

So we would encourage DOE to look at amending the test procedure, both to better reflect real-world performance and also to encourage good performance over a range of operating conditions, not just at the single

rated condition.

FACILITATOR BROOKMAN: Thank you.

MS. REICH: Thank you. Any other test procedure comments?

(No response.)

Then, moving on to the market and technology assessment, as you are familiar with, it is to characterize the state of the dehumidifier industry and market using historical data for shipments and trends, and also in the technology assessment portion to identify those technologies and strategies that can be used to improve efficiency of the units.

So the method, you know, is to identify and characterize the specific dehumidifier manufacturers, use various sources to develop data to look at the historical trends, to do a thorough survey of the technologies that are available that have been demonstrated to improve efficiency, and to identify the various regulatory and non-

regulatory or voluntary initiatives that can help encourage the implementation of more efficient products.

I would like to put out a request for comment. DOE requests information that would contribute to the market assessment, with information such as current product features and efficiencies, trends, historical product shipments, and prices.

FACILITATOR BROOKMAN: No comments.

MS. REICH: All right. It is useful to include here a definition of, under EPCA, exactly what is considered a dehumidifier. This is a statutory definition. It is a self-contained, electrically operated, and mechanically refrigerated encased assembly consisting of the components listed here.

DOE will consider categorizing dehumidifiers by means of product classes when evaluating energy conservation standards, and

the usual criteria for defining product classes are the type of energy used, the capacity of the equipment, and other performance-related features that can provide utility to the consumer.

As noted previously, the current standards have established five product classes for dehumidifiers based on the amount of moisture that they can remove in a 24-hour period under the DOE test procedure.

And as a starting point, in the framework document, DOE has proposed maintaining the same five product classes that are the basis of the upcoming October 2012 standards, but clarifying that these would apply to portable dehumidifiers. And by "portable" we mean those units that are designed to have an intake and exhaust to ambient conditions rather than a ducted installation.

So these will be defined as portable dehumidifiers, and the reason that we

are including this clarification is that DOE is also considering defining a separate product class for this ducted type of configuration, which are designated as whole home dehumidifiers.

Talking about whole home units a little further, an initial review of these products indicates that they use similar technologies as the portable units, but are designed to be operated and installed in a ducted configuration, normally in tandem with the home's central air conditioning system. And so they have, you know, a case that provides for inlet and outlet connection to a ducting system.

Some means by which they may differ from portable units is that the performance of the product in terms of the energy factor and capacity could be affected by air flow and pressure restrictions or impacts from the ducting. Many of these units are also installed with an additional fresh

air intake, alongside the return side air duct from the home, so that they would have management of two air streams at the intake side.

These units also are typically the larger size. They pretty much start at about 65 pints per day in capacity, ranging up to about 200 pints per day at the residential scale. An initial review of the energy factor -- energy factors that have been published for these units, albeit under the DOE test procedure that doesn't specifically have provisions for measuring a ducted installation, showed that there was no distinct correlation as you go -- increase in capacity with the energy factor. There was no real trend in energy factor, and so, therefore, DOE is initially proposing to include all of the whole home units in a single product class.

There are some portable dehumidifiers -- typically, again, some of the

larger capacity units -- that are designed to -- or have the option to be installed in a ducted configuration. And DOE is seeking information on how these products should be considered, how they should be tested and rated, because there are several options. These could be considered portable units without the optional ducting kit, and, thus, they would be tested in a configuration without ducting, which would be the least energy consumption.

Alternatively, they could be classified as whole home units, because they can be installed in ducting. And if they are tested in such a manner with greater restrictions, it's likely that that would be the most energy intensive way that you would test them. And it is possible that there would be some hybrid or some alternative means by which these would be tested.

So that leads me to the request for comment. In general, DOE would welcome

input from the stakeholders on those proposed classes and criteria for defining the classes, whether there should be more or fewer criteria that are the basis for the product classes, and also specifically on the classification of whole home dehumidifiers as a separate product class, and the potential for classifying these portable dehumidifiers that can optionally be operated in a ducted configuration, how those should be classified.

MS. MAUER: Jennifer.

MS. CLEARY: Jen Cleary with AHAM. I just was wondering if you could clarify a little bit what you are thinking about when you say the "ducted installation," like particularly with the portable ones that could be operated that way. Do you intend only to mean the ones that -- like the manufacturer provides specific instructions for ducting? Or would you anticipate that including any dehumidifier that the consumer could theoretically install in it?

MS. REICH: Well, I think we are seeking information on --

MS. CLEARY: Okay.

MS. REICH: -- what a recommendation would be on how -- on what the appropriate differentiation should be.

MS. CLEARY: Okay. Thank you.

FACILITATOR BROOKMAN: Thank you. Amanda.

MS. GONZALEZ: This is Amanda Gonzalez on behalf of the California IOUs. I was wondering if you could describe what you thought the unique utility was for the smaller capacity units.

My understanding is that they are less efficient but not necessarily -- they don't necessarily offer unique utility to consumers. And to this point, it is my understanding that Energy Star is moving away from having multiple capacity categories, and they are just jumping to two.

MS. REICH: Yes, that's correct

about Energy Star. And the -- you know, this was -- I think historically the differentiation was made on the basis of that -- different capacities having inherently different capabilities to achieve a certain energy factor level.

But, again, this was maintained -- this was based on the EISA 2007 differentiation. And if you have a comment on, you know, whether different or more or less differentiation would be appropriate, definitely welcome that.

FACILITATOR BROOKMAN: Other comments here?

(No response.)

Okay.

MS. REICH: Okay? In the technology assessment, there was a previous analysis conducted just before the EISA 2007 standards came out. It was a preliminary analysis that was conducted for dehumidifiers, and that is where most of these technology

options were identified.

But, you know, long list of potential means to improve efficiency, and we would certainly welcome any thoughts on those technology options, whether there are any that should not be considered, or whether there are any that were missed.

FACILITATOR BROOKMAN: Jennifer first.

MS. CLEARY: Hi. Jen Cleary with AHAM. In the framework document it says that DOE has identified, through research and review of product literature, additional designs that may be used to decrease dehumidifier energy use including heat pipe technology, which I see is on the list up there.

But I was just wondering if you could expand or provide information on the product literature and research that determined that, and it sounds like including heat pipe technology. Were there others that

were identified that aren't on the list?

MS. REICH: Well, the research identified many of those technologies are still being implemented that were identified in the previous analysis. So the heat pipe technology is the only new one that is on that list.

But, you know, it was a comprehensive review of products that are currently available on the market looking at research that has been conducted lately, a wide variety of sources.

FACILITATOR BROOKMAN: Joanna.

MS. MAUER: Joanna Mauer. I understand that there are some dehumidifiers on the market that employ air-to-air heat exchangers to pre-cool the incoming air using the cool air coming off of the evaporator. Is DOE planning to look at other pre-cooling technologies aside from heat pipe technology?

MS. REICH: Certainly. With additional information, we would be happy to.

MS. MAUER: Okay.

FACILITATOR BROOKMAN: There you see the list. Other comments?

MS. FARBER: Can I go back to the comment right before? I just have one --

FACILITATOR BROOKMAN: Please do.

MS. FARBER: -- piece of -- a clarification that I --

FACILITATOR BROOKMAN: Yes. Julia.

MS. FARBER: I'm sorry. The one about the whole home or the portable. Sorry. Julia Farber from UL. Just a point of clarification. Has the DOE taken any note of any reason or trend to understand why a portable system might be used over a whole home system based on geography? Are there any things to -- any data out there to imply that one region of the U.S. might use a different type?

MS. REICH: There has -- I am not aware of any information about geographical

distribution of their use. Our initial research has shown that these types of units are used in applications that have more limited ducting -- for example, a finished basement where the dehumidifier is desired to be located in an unfinished space nearby with a more limited amount of ducting than would be normally used for a whole home configuration. But again, you know, any input on how these are used, how they are installed --

MS. FARBER: Sorry. At this point, I just have --

MS. REICH: -- would be appreciated.

MS. FARBER: -- questions. Thank you.

FACILITATOR BROOKMAN: Amanda.

MS. GONZALEZ: Yes. This is Amanda Gonzalez with the California IOUs. I have a question about the whole home dehumidifiers. Is there a test procedure for that in place? And, if not, what's the plan

to develop one?

MS. REICH: Well, the current DOE test procedure does not have any ducting configuration. It is designed for the product to be, you know, tested in an environmental chamber as is. So the question would be, should DOE consider a new test method to test these units separately?

For the products that are currently rated with an energy factor, we believe that they are being tested according to the current test procedure.

FACILITATOR BROOKMAN: Joanna.

MS. MAUER: Joanna Mauer. Just a question about the first technology option, the built-in humidistat. Is that something that the potential benefits can't be captured by the existing test procedure? Or, in other words, would the test procedure have to be amended to be able to capture the potential energy savings that are built in --

MS. REICH: You know, that's a

very good point. I think you're correct.

MS. MAUER: Okay.

MS. REICH: Because the test procedure is designed to have the unit operating continuously under --

MS. MAUER: Constant.

MS. REICH: -- certain ambient -- yes --

MS. MAUER: Okay.

MS. REICH: -- set ambient conditions, so --

MS. MAUER: Okay.

MS. REICH: -- I think your comment is correct.

MS. MAUER: Because I think -- yes, I think we would encourage Julia to kind of analyze what the potential energy savings from -- from that technology option would be, and to consider potential amendments to the test procedure to be able to capture that technology option.

FACILITATOR BROOKMAN: Okay.

Thank you.

MS. MAUER: Thank you.

FACILITATOR BROOKMAN: Additional comments here?

(No response.)

Okay.

MS. REICH: Okay. I think we've actually covered this comment already, but one more opportunity to comment on product classes, particularly as we go forward to the engineering and life-cycle cost analyses.

FACILITATOR BROOKMAN: And particularly anything safety performance and consumer utility as relates to the product classes? Yes, please. Julia.

MS. FARBER: Sorry. Julia from UL. Just another point of clarification that I just need from somebody who knows the technology better than I. The list of technologies that you included, are there any that are highly susceptible to molding? That would need to be an additional consideration

in this procedure.

FACILITATOR BROOKMAN: Do we have someone who can answer that?

(No response.)

That one is voluntary.

MS. FARBER: No worries. Thank you.

FACILITATOR BROOKMAN: Okay. Okay.

MS. REICH: Okay. The second stage of the preliminary analysis is the screening analysis where the -- that long list of technology options are reviewed to see whether they meet the criteria for continuing to consider them in later stages of the analysis.

And those four criteria are the technological feasibility -- that is, whether they actually improve the energy efficiency and have been demonstrated to do so; whether they can be manufactured, installed, and serviced on the scale necessary at the time

that the new standards go into effect; whether there might be any adverse impacts on utility or availability of certain types of products; and whether there are any adverse impacts on health or safety.

Any comments on initial thoughts on those technology options and how they might be screened?

(No response.)

All right. Then, the next stage of the preliminary analysis is the engineering analysis, and that has an overarching goal of determining, for incremental improvements of efficiency of the product, what the incremental manufacturer cost would be.

The first step is to define what exactly is a baseline model, so that incremental increases in efficiency can be compared relative to these products. So a baseline is defined for each product class, and for the existing classes, which we are now defining as portable units for which there are

standards that will shortly be in place, the baseline is defined as this upcoming federal standard.

For whole home units, DOE's initial proposal is to define the same energy factor level as will be the standard for the large capacity, and that's the greater than 75 pint per day units.

Very interested to know whether these are appropriate efficiency levels for the analysis, for the baseline, particularly for whole home units, because these are newly being considered as their own product class. And then, further, DOE welcomes any input or information on what technologies, designs, control strategies, et cetera, would be characteristic of a model that just meets the baseline level.

FACILITATOR BROOKMAN: Comments here?

(No response.)

Okay.

MS. REICH: Okay? From there, DOE determines the cost efficiency relationship, and the first step is to determine whether it is going to be a design option approach or an efficiency level approach. And DOE is proposing at this stage to use the design option approach in which specific technologies are identified, along with their incremental efficiency improvement, and layered together to determine incrementally higher efficiency levels.

And the reason that this approach is being considered is because there are very -- the current data suggests there is little variation in a given product class in energy factors. So there are not a lot of products to choose from to use as representatives at various efficiency levels.

So to identify the contributions of each of these design options, a selection of products will be reverse engineered. They will be torn down and examined to see what

sort of approaches and designs manufacturers are implementing. That will be supplemented with testing to look at the various control strategies that might be used.

And, in addition, DOE makes a request from manufacturers to submit an industry aggregate information on cost at each efficiency level. So that cost data will be supplemented, where available, with additional confidential stakeholder interviews and any publicly available data.

So from that analysis, a cost efficiency curve will be generated for each product class that is analyzed.

I am just quickly showing you what the various contributors are to the industry cost submittal. These are -- there are two components to the manufacturer cost. There is the full production cost with things like direct material, labor, overhead, depreciation, and there are also conversion costs shown there.

So, again, where this information is made available to DOE, it is an industry aggregate that is shipment-weighted. And for reasons of not divulging any business proprietary information, where there are fewer than three manufacturers that are represented in a particular product class, that data would not be provided to DOE.

In addition, DOE requests information about the depreciation method that manufacturers use to expense their conversion capital.

This request for comment is to invite input on the feedback -- input on the use of a design option approach for determining the cost efficiency relationship.

FACILITATOR BROOKMAN: Yes. Jennifer.

MS. CLEARY: Jen Cleary. I just had a question. It's not really directly related to that comment, but it is in the section where that appears. On page 14 to 15

of the framework document it says, "DOE notes that, should the dehumidifier test procedure be revised to capture the benefits of high efficiency dehumidifiers, such as those that incorporate heat pipe technology, a wider range in EF would result."

I'm just wondering if you could expand on what the test procedure revisions might be there. Just the sentence I guess was a little unclear to us.

MS. REICH: Well, I think it's not that there is any specific revision being contemplated right now for the test procedure. But if, on the basis of what DOE learns from stakeholders during this process that some revision would be warranted that would be able to capture some real-world benefits that aren't currently measured by the test procedure, then you might able to see a broader differentiation in energy factor.

FACILITATOR BROOKMAN: Don Brundage.

MR. BRUNDAGE: Don Brundage, Southern Company. I think I know the answer to this, but I was just going to clarify it. There are some different technology dehumidification systems under development, such as desiccant systems. Since those would not use a cold plate and would not put out the removed moisture in a liquid form, this test procedure and this product class would not apply to those, would it?

MS. REICH: The only covered products are those that would meet that statutory definition.

MR. BRUNDAGE: So this would be -- a desiccant product would probably be an unregulated product with no specific standard associated with it until DOE chose to set one.

MS. REICH: I will let DOE comment on that.

FACILITATOR BROOKMAN: Stephen Witkowski.

MR. WITKOWSKI: Well, at this

point, we have looked at a number of technologies, and the determination is made that unless we meet the definition, then, yes, it would not be a product that we would regulate at this time.

MR. BRUNDAGE: Thank you.

FACILITATOR BROOKMAN: Yes, please. Is it Louis?

MR. STARR: Yes. Louis Starr with NEEA. I was just kind of interested, sort of a question or maybe a little bit of a concern. On the portable ones that could be ducted, it almost seems that that application could also be used in a whole house application, particularly in a retrofit.

And if you are increasing the efficiency of your whole house option, but also leaving the option of a lower standard for a portable one that could just be ducted in and out of the return, you are not only getting less efficient product there, but you are also doing some stuff with the fan energy

that kind of actually increases energy.

So you might think about that as one of the unintended consequences of creating that product class.

FACILITATOR BROOKMAN: Okay. Thank you. Other comments here?

(No response.)

None. Okay.

MS. REICH: A subset of the product classes that were identified are being considered for the engineering analysis and subsequent LCC and payback period analyses.

And this is for reasons of having a manageable number of product classes to analyze, and also, as was -- it is comparable to the approach that was taken for room air conditioners where certain representative product classes were analyzed and then the results, because technologies are comparable, the results can be extrapolated to the remaining product classes.

So DOE's initial proposal is to

analyze the portable product classes that represent the most number of -- the greatest number of products available -- namely, the 35 to 45 pints per day, the 45 to 54 pints per day, and the 54 to 75 pints per day.

In addition, because of the very different nature of whole home units, DOE proposes to analyze that product class as well.

DOE is required -- I'm sorry.

FACILITATOR BROOKMAN: Yes. Don Brundage.

MR. BRUNDAGE: My question on the whole home units is right now those would be classified the same as the portable and the largest size category. Is that correct, under the current -- under the current rulemaking that is about to go into effect?

MS. REICH: There is -- I am going to let Betsy correct me if I am misspeaking here. But I think it is open to interpretation whether a whole home unit is

currently a covered product. Is that correct?

MS. KOHL: This is Betsy. We are looking into that issue in the context of this rulemaking now, whether to establish a separate product class for those.

MR. BRUNDAGE: Well, the key issue would be whether anti-backsliding applies to it, if it is covered under the current rulemaking.

MS. KOHL: We are fully aware of that issue.

FACILITATOR BROOKMAN: Okay. Thank you, Don.

MS. REICH: So DOE is required, as one of the efficiency levels that it analyzes, to look at the maximum technologically feasible or so-called max tech efficiency level. In some cases, that is the highest efficiency product that is available on the market, otherwise known as a max available design.

And in some cases this may not

truly be a max tech level, if there are design options that are feasible but are not yet commercially available. So in cases where this occurs, DOE will seek stakeholder input on resolving the difference between the max tech and max available.

For the purposes of the initial proposal, DOE has based the max tech level on the maximum available efficiencies for products currently on the market. Again, the baseline for each of the product classes that are intended to be analyzed are shown above with those being the 2012 federal standards with the whole home product class being the standard for the greater than 75 pint per day units.

Efficiency level 1 is the highest efficiency that has been identified for products currently available in the 35 to 45 pint per day level -- capacity, excuse me. And the -- for 45 and 54 pints per day, that is a gap fill level between the federal

standard and the maximum available energy factor.

In the 54 pints per day to 75 pints per day, the 1.85 is the Energy Star level that will be applicable to units that are less than 75 pints per day. Between 75 pints per day, and I think it's 185, there is a second qualification criteria for Energy Star, which is the 2.8 which is proposed to be used as efficiency level 1 for whole home products.

The maximum available for 54 to 75 pints per day is the 2.47, and for whole home units that maximum available corresponds to the highest rated value that DOE's research identified. But, again, it is believed that that is tested according to the current DOE test procedure.

DOE invites comments and input on these efficiency levels, and, in particular, are interested to receive input on the max tech efficiency levels.

FACILITATOR BROOKMAN: Jennifer.

MS. CLEARY: Jen Cleary. I think you clarified it -- could you go back to slide 43? I think your explanation clarified this a little bit, but I think we are just getting a little confused in reading the level 1 row.

So the source says Energy Star, but that is actually only really the case for the 54 to 75? Okay.

MS. REICH: Yes.

MS. CLEARY: The two at the end, and then the 35.01 to 45 pints per day, that is the max available?

MS. REICH: That's correct.

MS. CLEARY: And then the next one is the gap fill. Is that --

MS. REICH: Yes.

MS. CLEARY: -- how it should be? Okay. So it is not intended that that whole row is actually the Energy Star.

MS. REICH: That's correct, yes.

MS. CLEARY: Okay. Thank you.

And a question is just how -- how did you reach the levels that are identified in -- for 2 and 3?

MS. REICH: Let's see. So for efficiency level 2, for 45 to 54 pints per day, again, that was the maximum available currently on the market. And so the gap fill between 1.6 and 1.8 was a halfway point to provide reasonable differentiation.

The max -- let's see. Well, for both 54 and 75 pints per day, and whole home units, efficiency level 2 is a gap fill between the levels that were based on the Energy Star qualification criteria at level 1 and the maximum available, and those levels were chosen based on availability of products at or near that gap fill level that could be used as the basis of the analysis.

And then, of course, the maximum available were based on certified values for those units on the market.

MS. CLEARY: Thank you.

FACILITATOR BROOKMAN: Final comments on item 5.5?

(No response.)

Nothing additional.

MS. REICH: Okay. So DOE looks at all design options that are available in products already being sold or have been demonstrated in a working prototype, which may include designs or technologies that are proprietary.

But those designs are only considered for the purposes of the engineering analysis as long as there are other means to reach the efficiency level that that proprietary design can achieve.

In other words, DOE does not want to consider only an approach, only an efficiency that can be reached by means of this one unique pathway. And, therefore, the confidentiality in proprietary business information can -- for manufacturers can be maintained.

So the request for comment is, are there any proprietary designs or technologies for dehumidifiers that DOE should be aware of in conducting this rulemaking? And, if so, how should DOE acquire cost data necessary to evaluate those designs?

FACILITATOR BROOKMAN: Nothing additional? Yes, Joanna.

MS. MAUER: Joanna Mauer. Sorry. This is a comment going back to the request for comment on the efficiency levels. Just an observation. I think on the -- for the whole home category, it seems to be a pretty big jump from level 1 to level 2, and also level 2 to level 3.

And there may be kind of a technology jump at some point, but we might encourage DOE to perhaps add one or two additional efficiency levels, especially for that whole home category, just because it is -- you know, they are big jumps right now it seems like.

MS. REICH: Thank you.

FACILITATOR BROOKMAN: Other comments here?

(No response.)

Okay.

MS. REICH: Okay. And then, finally, there is some overlap here with the topic of looking at the impact of regulatory changes in the engineering analysis as well as the manufacturer impact analysis.

But the intent is to consider the impact on manufacturers that are subject to multiple regulatory changes at the same time in addition to this dehumidifier standards rulemaking.

And as many of you are aware, there are recent standards that -- for dishwashers and clothes washers that will go into effect, unless DOE decides otherwise in the next week, and there were also in 2011 new standards that came out in a final rule for clothes dryers and room air conditioners.

In addition, you know, some other issues that manufacturers may have to deal with is the RoHS topic, and so the request for comment would be, are there any other regulatory issues that DOE should consider?

FACILITATOR BROOKMAN: Don Brundage.

(Off-mic comment.)

FACILITATOR BROOKMAN: Thank you.

MS. REICH: And actually, I would be interested, if you could clarify, are these local building codes or state building codes that are driving this?

MR. BRUNDAGE: Well, the IECC code. And if you want a point of reference, there has been a lot of consideration of this in the Florida -- Florida Solar Energy Center has done a lot of research on this and related to -- they have considered this in local customization of their Florida building codes for making adjustments to the IECC.

They were considering at one time

requiring supplemental dehumidification in certain very humid areas of the state. I don't know what became of that, but at one time that was under active consideration to require supplemental dehumidification as part of their building code.

MS. REICH: Thank you for that information.

Okay. If there are no more comments on other regulatory issues, I will turn it over to Ben Barrington, who will discuss the preliminary manufacturer impact analysis.

MR. BARRINGTON: Thanks very much, Judy. Ben Barrington with Navigant Consulting. If you were here earlier, I presented on the manufacturing impact analysis for commercial clothes washers, which is remarkably similar to this, except for the fact that in that rulemaking we are going straight to NOPR, and in this we have two phases.

We have a preliminary manufacturer impact analysis followed by a NOPR phase manufacturer impact analysis, both of which I will present at this point in time in the interest of me not getting up and down more than once.

As mentioned earlier, the manufacturer impact analysis satisfies two of the seven requirements put forth by EPCA in terms of economic justification for an amended efficiency standard, those being the impact directly to manufacturers as well as the potential of any lessening of competition within the industry in question.

Additionally, there are some finer points on the methods and procedures used in the manufacturer impact analysis in the report listed in the link at the bottom of this slide.

Where we do a full-scale rulemaking that includes both the preliminary analysis phase and the NOPR phase, we break

things out into six distinct steps for the manufacturer impact analysis. Again, starting with the industry profile in which we build off of a lot of the information collected during the market and tech assessment, identifying both current and past industry structures, and trends that we see carrying forward.

Additionally, we look through public records, 10Ks, annual reports that are publicly available for each of the constituent manufacturers, and develop industry average financial parameters that we then later use in our government regulatory impact model.

At this point in time, we also dig through manufacturer databases and try to identify any particular manufacturer subgroups that we think merit special consideration in terms of them potentially seeing different impacts of -- excuse me, impacts of a different magnitude than other manufacturers.

As we are doing the preliminary

analysis phase, we do a first round of interviews with manufacturers in conjunction with the pre-NOPR phase engineering analysis interviews, and this allows us to identify some of the key issues that we see manufacturers facing, as well as develop or inform our preliminary analysis, which primarily relates to understanding how manufacturing capital might change in this industry as a result of new standards.

From there, in the second phase of the preliminary analysis, we tailor our government regulatory impact model, which is a discounted cashflow model of future cashflows for the industry, as a result of or in light of information gained in the first round of interviews. And then, we use this framework to determine what other types of information we would need to carry out the full analysis.

With that information, or with that understanding of the information gap, we develop interview guides to take back to

manufacturers to complete our analysis.

And these topics include key issues, questions about market share, markup structure for the -- for their first customers, the shipments analysis, verifying our assumptions that went into developing the financial parameters that we had earlier, how capital and non-capital expenditures might be made in light of new efficiency standards, as well as the cumulative regulatory burden, impacts to direct employment, manufacturing capacity, as well as competitive effects and how those might play out on manufacturer subgroups.

Sorry I haven't been pausing for questions, but if anyone has anything, please feel free to speak up.

(No response.)

Okay. Okay. With those guides circulated, we conduct interviews with manufacturers that are protected by a non-disclosure agreement between the manufacturer

and Navigant Consulting, and we maintain those records in confidence.

The information gathered in those interviews is then aggregated up to an industry representative depiction of what the impacts might be with new efficiency standards in place as to anonymize the information and maintain that confidentiality. From there, we populate our model and quantitatively assess the impacts to the industry net present value, as well as cumulative regulatory burden and the effects on competition and those other factors that I earlier described.

At this point in time, the sort of preliminary analysis that we have done to date indicates that there are five -- or potentially five small business manufacturers of residential dehumidifiers. And if I am not mistaken, the Small Business Association defines a small business as anyone employing fewer than 500 employees.

Additionally, we anticipate that

there would be some cumulative regulatory burden borne of other efficiency standards from DOE, including those for dishwashers, clothes washers, clothes dryers, and room ACs, both existing and upcoming rulemakings in that regard, as well as the EPA-mandated phase out of HCFCs and the RoHS directive.

And with that, we are requesting comment on any potential manufacturer subgroups that we haven't yet considered outside of small businesses, if anyone cares to comment on that.

(No response.)

No? Okay. And also, just in terms of doing our own due diligence, we feel that people in the industry themselves might be aware of other small businesses that could be affected by this rulemaking that we may not have uncovered. So if anyone can provide names and contact information, that would be greatly appreciated as well, and we are happy to take that here or after, as always.

All right. So I am going to take us out to the break really quickly. So in terms of cumulative regulatory burden, if there is anything beyond that list of three or those three types of regulations that we think might impact the industry, we also welcome comment on that.

All right. I'll turn it back to Doug.

FACILITATOR BROOKMAN: Thank you. Do you want to take a break now, or do you want to keep going for a little bit longer? Let's break. Okay. Let's try and make it back here for real in 15 minutes. All right? That means we'll start on the dot at 2:30 according to that watch.

Very good this morning; we are being very disciplined today. See you back here to start up. Wear your badges in the hallway, please. The restrooms are on both ends of the halls. If you are going to go grab some beverage, do it quickly. We'll see

you back here shortly.

(Whereupon, the above-entitled matter went off the record at 2:14 p.m., and resumed at 2:29 p.m.)

FACILITATOR BROOKMAN: So we're going to proceed. Ladies and gentlemen, we are going to proceed, and we are going to hear next from Camilla Dunham Whitehead.

MS. DUNHAM WHITEHEAD: Good afternoon. My name is Camilla Dunham Whitehead, and I want to thank you all for being here today and showing interest in the dehumidifier standards rulemaking. I want to thank Judy and Ben for their earlier presentations.

I am going to be talking about two main analyses in the preliminary analysis phase of this standards rulemaking, and then I am going to -- after I conclude the national impact analysis, I will touch on six analyses that will be conducted during the NOPR phase, or the Notice of Proposed Rule phase.

So I am going to start with the LCC and payback period analysis and talk about two key inputs into that analysis. For those of you who were here this morning, this will all sound very familiar. These analyses, as you know, are applicable to numerous different products and equipment.

I am going to talk about the life-cycle cost and payback period. The life-cycle cost is the total cost of owning in this case a dehumidifier over the lifetime of that product, and that includes both operating and installed costs. The first thing that I will talk about is the markups, which is part of the total installed cost.

Markups are multipliers that convert manufacturing cost into consumer product price. And consumer product price data is important as inputs into the life-cycle cost analyses and also into the national impact analysis. So DOE looks at the distribution chain of the dehumidifier to see

what sorts of markups will be needed to transform the manufacturer cost into the consumer price.

The latest AHAM Fact Book reports that 93 percent of most consumer products move from the manufacturer directly to the retailer where they are sold to the consumer. So DOE has assumed that there are three parties along this distribution channel that it should consider.

For the markups, for manufacturing costs, DOE looks at the Securities and Exchange Commission 10K reports that are filed by publicly traded manufacturers. For the retailer markup, DOE looks at the SEC 10K reports for publicly traded retailers in addition to U.S. Census Bureau data.

As a part of the retailer markup, too, we look at the sales tax that consumers would pay, and we get information about the sales tax from the Sales Tax Clearinghouse.

So DOE plans to use retail price

data to validate the overall manufacturer-to-consumer markup. Markups enable DOE to use retail prices in the calculation of first costs, which, as I mentioned to you earlier, is one of the primary inputs into the LCC and payback period analysis.

You have seen these requests for comments. You will see them also throughout my presentation. The comments are directed -- direct stakeholders to provide input to DOE based on the purpose of the analysis, the approach that DOE intends to use, data sources that DOE intends to use, and also as an opportunity to provide information to DOE.

So I am moving into the energy use characterization. Energy use is a part of the lifetime operating expenses portion of the LCC analysis. For the LCC, DOE establishes annual energy consumption and assesses energy savings potential of various product efficiencies. You heard about some of those product efficiency levels in the presentation by Judy

earlier.

DOE will potentially analyze six product classes that you see here in the green box on this slide. DOE recognizes that energy use varies across households depending on the product's characteristics and also how the product is used.

With databases from the Energy Information Administration, the California Energy Commission, in conjunction with engineering analysis results, DOE will develop annual energy use for each U.S. household that has a dehumidifier.

For the 2007 dehumidifier preliminary analysis, insufficient household data was available to enable DOE to really examine things on a household level, so AHAM provided data about capacity usage and energy use on a month -- on an hourly basis over a 12-month period.

DOE hopes to improve upon the 2007 estimates of energy consumption and usage with

current -- for the current rulemaking with more recent reports, research reports, and information provided by stakeholders.

For dehumidifiers, annual energy use is calculated by multiplying capacity by the hours of operation and dividing the product of those two quantities by the energy efficiency of the device.

So I'm referring, you can see here, to this equation. So capacity -- the units for capacity are pints of moisture removed from the air. Hours are the number of hours that the dehumidifier is in operation in a 24-hour period. And then, efficiency is the liters of moisture removed per unit of energy consumed.

We have repeated that calculation using the data sources that we hope to use for each of those different quantities.

Here is a request for comment. Again, DOE seeks comment on its proposed approach for determining energy use and also

on the sources that it intends to use. DOE also requests any information or data stakeholders may have that would help in its characterization of energy use.

FACILITATOR BROOKMAN: Comments here? Don Brundage.

MR. BRUNDAGE: I've got a general comment that I'm not sure where is the best place to get it in, so I might as well do it here. For whole house dehumidifiers, they are essentially a supplement to increase the dehumidification capability of a whole house air conditioner unit.

And I don't know that -- it would be nice if there was an alternative to having a separate, totally independent system to be an integrated system. How you would do that without violating the anti-backsliding on the standard air conditioning products rule, I don't know.

But it just seems to me that if you had an integrated product to provide

supplemental dehumidification you could do, combined across both functions, more efficiently than establishing an entirely separate system.

I think the Department needs to consider if there is some possible way to define a product to do that, which I think would save more energy in total than playing around with how you make a separate dehumidification system slightly more efficient.

Thank you.

FACILITATOR BROOKMAN: Thanks, Don. Other comments here? Yes, please. Julia.

MS. FARBER: Julia Farber from UL. I was just wondering, can you just define for me one more time what characterizes as a household, how you're defining it here?

MS. DUNHAM WHITEHEAD: What characterizes --

MS. FARBER: Sorry. How are you

defining a household? Is it --

MS. DUNHAM WHITEHEAD: Well, actually, what we use is the Energy Information Administration's Residential Energy Consumption Survey. And so we use RECS as the -- sort of the basic household sample. And so how the government currently defines a household in terms of that particular survey is how we will continue -- we will continue that on through our consumer analysis.

FACILITATOR BROOKMAN: Yes, Joanna.

MS. MAUER: Joanna Mauer. On the previous slide where you showed the equation for calculating energy use, the dehumidifier efficiency, would that be the rated efficiency or -- so at the -- efficiency at the rating -- the rated conditions based on the current test procedure?

MS. DUNHAM WHITEHEAD: That would be information, yes, in a sense that we would get from the engineering analysis.

MS. MAUER: Okay.

MS. DUNHAM WHITEHEAD: And we would use a range of efficiencies that would be appropriate for that product class, and then assign them to the household based on a Monte Carlo simulation, which I will get into in a little bit.

MS. MAUER: So I guess based on the current test procedure, if, you know, field conditions are typically lower ambient temperature and relative humidity, the kind of energy factors and efficiencies we would see in the field would -- I think would -- typically may be significantly lower than what we see out of the test procedure.

So I think if -- I mean, we would also encourage DOE to consider amending the test procedure. But kind of based on the current test procedure, it looks like this energy use calculation may significantly underestimate annual dehumidifier energy use, if it is based on the rated conditions.

MS. DUNHAM WHITEHEAD: We will take into consideration field measurements through published reports that could be considered as sort of a range that is appropriate for that particular capacity unit or product class.

FACILITATOR BROOKMAN: Okay. Additional comments here?

(No response.)

MS. DUNHAM WHITEHEAD: Okay. So now I am going to talk more fully about the life-cycle cost and payback period analysis. I am going to talk again -- I'm showing you this slide again. After I talk about the purpose and approach of the LCC and payback period, I will go more into the inputs in the second and third columns on this flowchart.

So the life-cycle cost analysis establishes the total cost of dehumidifiers over their lifetime, and the payback period analysis determines the amount of time required for the energy cost savings to pay

back any increased cost from a higher efficiency.

We do both of these analyses using an Excel spreadsheet. The savings that are quantified are then discounted to a base year, typically the year that the NOPR is conducted, the Notice of Proposed Rule.

You see here a graphic that shows the two major inputs, the first costs and operating costs into the consumer lifetime cost. There will be a baseline established and a standard, and the difference between the two would show the LCC impact.

DOE conducts the LCC using a Monte Carlo simulation. A Monte Carlo simulation and probability distributions model both the uncertainties and variabilities of the inputs, enabling DOE to look at -- to identify percentages of consumers who benefit from or who are negatively impacted by a proposed standard.

Each Monte Carlo simulation

represents 10,000 calculations of life-cycle cost and payback period, which reduces the error brought in by uncertainty or variability. And as I just mentioned earlier, the Energy Information Administration publishes the Residential Energy Consumption Survey, and that sample forms the basis of the energy use characterization from the house -- from the consumer perspective.

Each product class is analyzed separately, and there is a base case efficiency distribution that would -- that I will get into in a later slide, but that characterizes the mix of efficiencies that are in use in the nation in a given year of this -- of the analysis period.

Here is a sample slide. This is from the dishwasher LCC analysis. You notice that in the upper graph there is the number 10,000. That is the number of LCC runs for this Monte Carlo simulation. The thick blue line is -- rests at zero and represents the

no-impact line. Everything to the right of the line is a benefit, and to the left of the line in red is not a benefit.

The dotted blue line is the average life-cycle cost savings, and that is $17 here. That $17 you can pick up down below in the table. It is shown there as 16.8. The other numbers to take note of in the table are the no impact and the net benefit, which together summed equal about 68 percent receiving no impact from the standard or a benefit from the standard. Conversely, the 32 percent number is that percentage of households who are negatively impacted by the standard.

The request for comment on the proposed approach, and also a data request to characterize the current mix of dehumidifier efficiencies.

FACILITATOR BROOKMAN: No comments here?

(No response.)

MS. DUNHAM WHITEHEAD: Okay. So now I am transitioning to the second and third columns on the flowchart, and I will start with electricity prices. Electricity prices, combined with energy use, will show how much any given household will need to spend on energy to operate its dehumidifier at a given efficiency level.

DOE uses the EIA Form 861, which provides electricity utility data, and DOE will estimate average electricity prices using the EIA data covering 13 geographical areas, nine census divisions, plus four large states. For future savings, DOE uses electricity price projections to residential consumers as reported in EIA's Annual Energy Outlook. DOE requests input on the planned approach for using -- for estimating current and projected electricity prices.

As we did this morning, we are covering three inputs here. Installation costs are part of the first costs and the two

primary inputs into the LCC. Maintenance and repair costs are part of that -- lifetime operating expenses.

We have grouped all three of them here together, because DOE assumes that there are no additional costs from installation, maintenance, or repair related to a higher efficiency unit. So DOE also requests comment on that assumption and information or data where that is relevant as well.

FACILITATOR BROOKMAN: Thoughts on that?

(No response.)

MS. DUNHAM WHITEHEAD: Okay. On to product lifetime. DOE will use information from available literature sources, as well as any inputs from stakeholders, as to product lifetime. Appliance Magazine is one source of information. If stakeholders have other suggestions for product lifetime, we would be happy to have that information.

FACILITATOR BROOKMAN: Additional

sources?

(No response.)

Okay.

MS. DUNHAM WHITEHEAD: The discount rates -- Can you all hear me in the back?

FACILITATOR BROOKMAN: I think that will work. It's on.

(Pause.)

MS. DUNHAM WHITEHEAD: It's going to make me break into song --

(Laughter.)

-- which would be a problem.

Okay. Discount rates -- discount rates are the last of the inputs that I will discuss here. DOE uses discount rates to determine the present value of lifetime operating expenses that occur into the future.

The approach for dehumidifiers is consistent to other product rulemakings, but, to summarize, DOE estimates that interest or finance costs to purchase a dehumidifier,

these can be seen as the cost of raising funds to buy a product from the financial costs from debt incurred or opportunity costs from equity used.

Much of the data required for the discount rate determination comes from the Federal Reserve Board's publication Survey of Consumer Finances.

And here is a comment box requesting input on the planned approach for estimating discount rates.

Okay. The last thing that I will cover here in the life cycle is the base case efficiency distribution. Just to make it clear, it is important that DOE -- that DOE recognizes that all of the dehumidifiers currently at use in the field now in people's homes aren't of uniform efficiency level.

And so DOE will attempt to characterize that mix of efficiencies that are currently in use, and that is what we call the base case efficiency. And that is to avoid

overcounting benefits of a higher standard.

So this comment requests input on the proposed approach and also any information or data that would help DOE characterize that base case efficiency distribution.

Okay. So we are back to this orienting slide of the chevrons. I am moving into the second input into the national impact analysis, which is the shipments analysis. The purpose of the shipments analysis is to estimate the impact of appliance shipments caused by potential new efficiency standards.

The method relies on the development of a shipments model, which is based on a variety of sources and includes historical shipments data. The shipments model considers only the products that are covered by this particular rulemaking, which in this case is residential dehumidifiers.

The shipments model provides two main functions. The first is a projection of shipments during each year that the standard

is in effect, and the second purpose is to account for the total inventory or stock of appliances that are in service in the nation for any given year in the analysis period.

Furthermore, the model keeps track of the age of the stock, so that the vintage-dependent appliance energy use and operating costs can be accurately assigned. So when I use the words "vintage-dependent" here, I mean the distribution of efficiencies that were present in that given year.

So the first step in the shipments analysis will be to protect appliance shipments under the base case, and that means the case when no new standards are adopted. Under the base case, shipments will be projected for two primary markets -- new construction and then units shipped as replacements for failed equipment.

Shipments to new -- the new construction market will be estimated by multiplying projections of new housing stock

-- new housing starts, sorry -- by historical rates of product ownership or product saturation rates.

DOE will get the projections for new housing starts from the Energy Information's Annual Energy Outlook. And the RECS and the AHAM Fact Book -- the Residential Energy Consumption Survey and the AHAM Fact Book provide input that DOE can use as product saturation rates.

The shipments' projections will be calibrated to the historical shipments data by first determining the discrepancy between the historical projections that we will call "backcasts" and the shipments data. DOE plans to attribute any discrepancy between the two to early replacement.

Replacement shipments will be estimated by applying product retirement functions to existing product stock in the overall housing stock. Retirement functions will be based on the product lifetime

estimates developed in the LCC and payback period analysis and from historical shipments data.

Known sources for the historical shipments are Appliance Magazine and the AHAM Fact Book. Requests also will be made to stakeholders for information and input.

Yes?

MR. BRUNDAGE: Don Brundage, Southern Company. Continuing on my earlier comment, if you will drop back to the slide before this, it is really just with the last couple of versions of the IECC code that it has become a real issue on increasing the need for supplemental dehumidification. And most jurisdictions didn't adopt those until about 2009.

So I would caution you against doing a long-term linear trend, pay special attention to the most recent couple of years, because it may have a different pattern than earlier. I realize with very few housing

starts the last few years that is problematic, but I would expect to see different behavior the last few years than in earlier years.

MS. DUNHAM WHITEHEAD: Okay. Thank you.

FACILITATOR BROOKMAN: Thank you. Yes, and Louis.

MR. STARR: Louis Starr with NEEA. The other aspect -- and I think in your shipment direction, it does sound like you are somewhere in there also including units on a refurbished -- or retrofitting existing units, or sometimes when people put in new units in a house they go ahead -- they are usually sold on things like humidifiers and all kinds of things.

So to the extent that you are capturing that in your shipment projections -- it sounds like you are, but just want to confirm that.

MS. DUNHAM WHITEHEAD: Yes. We try to capture both the new construction or

first units and then also the replacement units. And if I am understanding you correctly --

MR. STARR: Well, it says "failed units." You never had one in the first place, you didn't have a failure, right?

MS. DUNHAM WHITEHEAD: That's correct.

MR. STARR: Okay.

MS. DUNHAM WHITEHEAD: So --

MR. STARR: Do you see what I'm saying?

FACILITATOR BROOKMAN: Yes. And you're suggesting the configuration may be different for it, right?

MR. STARR: Well, for --

FACILITATOR BROOKMAN: For a replacement unit.

MR. STARR: Yes. For instance, when you buy a new air conditioner, you might buy an air filter, and you may not have had one in your first one, in the same way you

might buy a humidifier or dehumidifier for your house, because you are replacing a unit.

And I think you can speak to that one, right, yourself? So --

MS. DUNHAM WHITEHEAD: Yes.

MR. STARR: -- it's a very common thing that people will -- it won't -- you won't have -- the unit won't have failed, and you won't have a new house. You will have an existing house that you will add this unit to, and I think that's a very popular item that happens.

MS. DUNHAM WHITEHEAD: Yes. I think that that's important to characterize.

FACILITATOR BROOKMAN: Don Brundage.

MR. BRUNDAGE: I would also point out the third thing is retrofit into existing construction. And one of the reasons you have this is if you have an older generation air conditioner, they tended to, for single speed units, to have better dehumidification

performance among older SEER8, SEER10 units, than new minimum efficiency units.

So someone may have been adequate on dehumidification on their old, inefficient unit. They get a new unit in and find objectionable levels of internal humidity and feel the need to go in and put in a supplemental system. So there's three sources of shipments, and it is real. I have -- we are hearing in the market about people doing retrofit of supplemental dehumidification systems in existing homes.

Thank you.

FACILITATOR BROOKMAN: Thank you. Okay. Helpful comments. Joanna.

MS. MAUER: Joanna Mauer. Just a followup, Don. Is there any data available on that trend that you're seeing? Because I think AHRI did look into this issue of whether there is some correlation between SEER and basically sensible heat ratio. And I thought they found that there in fact was basically no

correlation.

MR. BRUNDAGE: There is not any correlation on the current new products in the market. The older products that are being retired now tended to have very cold temperatures on the internal -- in the condenser. It's anecdotal. I don't have any data, but we have seen a lot of examples of that.

FACILITATOR BROOKMAN: Thank you.

MS. DUNHAM WHITEHEAD: Okay. Here is a data sheet that stakeholders can use to fill in shipments information. As you can see, we go back to a 1997 year, but we wouldn't be opposed to receiving earlier data as well. For the different -- and you can see across the different columns the different potential product classes that are considered at this point.

So after developing our base case shipments projections, we then need to develop standards case shipments projections, and that

assumes that a standard -- a new standard has been adopted.

The standards case shipments projection is developed in much the same way as the base case's shipments projection, but with one important difference, and that is that we account for the purchase price increases and the operating cost savings that would be due to any standard to estimate any changes to the base case shipments projections.

If we are not able to obtain data that show how appliance shipments are affected by purchase price or operating costs, we may project standards case shipments with scenarios that assume certain drops in annual shipments for particular standards levels.

And, finally, we will incorporate any impacts from market-pull programs, such as Energy Star or tax credits on projected standards case shipments.

DOE has collected the request for

comments for the shipments analysis on this slide. Again, DOE requests comment on the approach that it proposes to use, the data sources that it proposes to use, and also requests information or data that will help in developing the shipments model.

FACILITATOR BROOKMAN: Anything additional at this time?

(No response.)

Okay.

MS. DUNHAM WHITEHEAD: Okay. So now we are going to cover the last analysis in the preliminary phase of the standards rulemaking, and then I will touch briefly on six analyses that will be covered in the next phase of the standards rulemaking.

The purpose of the national impact analysis is to estimate the energy savings and economic inputs that may result from a standard. National energy savings and economic inputs are calculated on an annual basis before being summed into a cumulative

value.

The NIA uses a model that incorporates projections of product shipments and then tracks the inventory of dehumidifiers that is in service in the nation for any given year. Each year, as new appliances are shipped and old appliances are retired, the analysis adds and subtracts appliances to the existing stock. Thus, the model estimates the historical, current, and projected stock of dehumidifiers in the nation.

The NIA also employs the per unit total installed cost and per unit annual energy consumption developed in the LCC analysis and aggregates these costs and energy use values based on the vintage of the stock.

Energy savings are defined in terms of quads saved; that is, quadrillion or 10 to the 15 BTUs saved. While energy use in the LCC analysis is determined at the site level -- that is, the building or household where the dehumidifier is used -- the NIA

calculates the energy use at the source. And I will touch on that a little bit in a later slide.

The economic impact is defined in terms of the national net present value or NPV and is calculated in dollars. Because the standard is an effect over several years, we discount the value of future savings in order to estimate the present value of the national impact using a discount rate.

So this is a slide similar to the one that Maithili used this morning. You can see that the shipments analysis produces two different chains -- a base case projection and a standards case projection -- starting -- the calculations begin in the year 2019, the assumed effective date of the standard, and go 30 years to -- through 2048.

So then those annual savings are summed together to produce a base case cumulative energy use value and a standards case cumulative energy use value.

The difference between the base case and standards case cumulative energy consumption is the savings, the cumulative energy savings. And at this point in the calculation, there is a site-to-source conversion that takes place that I mentioned that I would get into a little bit more in a later slide.

So the difference between those two values with a site-to-source conversion results in the national energy savings.

Here is a similar flowchart for the national economic impacts or the net present value. As with the calculation of national energy savings, base case and standards case shipments are projected from the time the standard takes effect through 30 years.

So we look at the economic impacts for the costs of electricity, repair, and maintenance, and total equipment. We sum them together on an annual basis, and then sum the

energy cost and the repair and maintenance cost together to yield the cumulative operating cost savings. And we summed the total equipment costs to -- on the annual basis for a cumulative total equipment cost increase.

The difference between the base case and standards case cumulative operating costs yields, as I said, the cumulative operating cost savings, and then also, similarly, the total equipment cost increase.

The difference between the cumulative operating cost savings and the total -- the cumulative total equipment cost increase, if the -- I'm sorry, let me restate this. If the cumulative operating cost savings is greater than the total equipment cost increase, then the nation experiences a net benefit to the possible standard level. If the operating cost savings is less than the total equipment cost increase, then the nation experiences a net burden from the proposed

standard.

Okay. So this next slide covers the need for historical shipment weighted efficiency data. It is a key input into the national impact analysis. Key inputs into the NIA are dependent on shipment-weighted efficiency data.

For example, per unit annual energy consumption data are used to determine the national energy savings. And equipment retail price and per unit annual operating costs, as I just showed you in the slide, in the flowchart, are used to determine the net present value.

Historical trends of the shipment-weighted efficiencies are used to determine future equipment efficiencies for the base case. Additionally, market share efficiency data help determine the impact to base case shipment-weighted efficiencies.

Data sources include the AHAM Fact Book, which reports shipment-weighted

efficiencies for all dehumidifiers. And because DOE runs its analyses based on the product classes, it requests shipment-weighted efficiencies broken out by product class.

Here is another data request form that shows tentative efficiency levels within each of the product classes.

On August 18, 2011, DOE published a Notice of Policy stating its intention to incorporate the full fuel cycle metric into the cost-benefit analysis. The methodology is based on the calculation of an FFC or full fuel cycle multiplier for each of the primary fuels used by the product, which in this case would be electricity. And further discussion and presentation will be made of the full fuel cycle in the technical support document for the preliminary analysis.

So here are two requests for comment -- again, requesting comment on the planned approach and also for information and data.

Okay. So this -- I am moving beyond the preliminary analysis into the NOPR, Notice of Proposed Rule, analyses. And as I said earlier, I will touch on six analyses here. I will go through the purpose very briefly and the proposed method.

So this shows the orientation in some of the analyses -- or the analyses that I will touch on here. I just want to note that Ben already talked about the manufacturer impact analysis earlier this afternoon.

So the first analysis that I will cover is the life-cycle cost subgroup analysis, and the purpose of this particular analysis is to look at different consumer populations that may be disproportionately affected by the standard.

The method used is identical to the LCC determination for the general population, but we just use a sample that is dedicated to that particular subgroup when running the analyses.

Our request for comment will follow each of my presentation of these six analyses, and, again, DOE is looking for comment on the proposed approach.

So on to the utility impact analysis. The purpose of the utility impact analysis is to assess the impact of standards on energy suppliers. The method that DOE has used and proposes to use for this rulemaking is to use a variant of NEMS -- National Energy Modeling System -- called -- the variant is called NEMS-BT. And we modify the NEMS so that we are able to analyze the effect of the appliance standard.

I am going through these a little quickly here because they will come up again in the -- after the preliminary phase. They will become more relevant in the NOPR phase of the standard rulemaking. Here is a request for comment on the utility impact analysis.

So for the employment impact analysis, its purpose is to assess the overall

impact on the national employment from standards. Employment impacts are analyzed both as direct impacts and indirect impacts. Ben covered direct impacts. The employment analysis -- impact analysis at this stage looks at indirect impacts.

And that effect comes from the fact that consumers are experiencing increased costs, but they are also, at the same time, experiencing operating cost savings. And so the operating cost savings results in consumers having additional funds that can -- higher purchasing power than can go to -- into the retail sector. And so it is looking at the effect of that possibility.

DOE uses the model ImSET, which stands for the Impact of Sector Energy Technologies. And here is a request for comment.

So the emissions analysis is to estimate the effect of standards on airborne emissions from power plants being used to

generate electricity in the case of dehumidifiers. For the purposes of estimating the impacts at the power plant, we used NEMS-BT, the same tool that is being used, or proposed to be used, for the utility impact analysis.

There are a list of emissions here, and DOE requests input on inclusion of these emissions and any others that stakeholders would like to include.

FACILITATOR BROOKMAN: Don Brundage.

MR. BRUNDAGE: Don Brundage, Southern Company. Just to repeat a comment from this morning, things are moving very rapidly with changes in generating units and the electric utility market. So it is -- I think NEMS-BT will handle that, but it is -- using the most up-to-date possible information in that particular area will be very important.

FACILITATOR BROOKMAN: Okay.

Thank you.

MS. DUNHAM WHITEHEAD: Thank you. Okay. Finally, the regulatory impact analysis analyzes non-regulatory alternatives to standards; for example, rebates, voluntary efficiency programs like Energy Star, tax credits, or procurement programs offered by state and federal governments.

The method to conduct the regulatory impact analysis is to modify the NIA model, national impact analysis model, and we modify key inputs to determine what the impact from non-regulatory alternatives are.

Stakeholders -- we don't have a specific comment box for the RIA, but stakeholders are welcome to send in comments on the regulatory impact analysis.

So I have covered two key inputs in the preliminary analysis phase, and then six -- very briefly six additional analyses in the NOPR phase. I invite any comment or question at this point before turning the

microphone back to Doug.

FACILITATOR BROOKMAN: Nothing additional?

(No response.)

Okay. Thank you.

MS. DUNHAM WHITEHEAD: Thank you very much.

FACILITATOR BROOKMAN: So a lot of good content here this afternoon. As we promised at the outset, another opportunity for anybody that wishes to make -- raise other issues that need to be raised at this time before I turn it back to Stephen Witkowski.

(No response.)

Okay. Thanks to all of you. Stephen?

MR. WITKOWSKI: Again, I just want to thank all of you for attending and participating. And to repeat what everyone else has said, if you have information, data, whatever, please get it into us. The comment period closes October 17th, and we certainly

look forward to and encourage your participation.

And thank you very much.

FACILITATOR BROOKMAN: I'll hand out a quick evaluation form, as we always do.

Thank you. Safe travels, everyone.

(Whereupon, the above-entitled matter concluded at 3:17 p.m.)

C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Conservation Standards for Residential Dehumidifiers Meeting

Before: US DOE

Date: 09-24-12

Place: Washington, DC

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

Neal R Gross

Court Reporter