BEFORE THE

UNITED STATES DEPARTMENT OF ENERGY

PUBLIC MEETING ON THE NOTICE OF AVAILABILITY OF A FRAMEWORK DOCUMENT FOR ENERGY CONSERVATION STANDARDS FOR RESIDENTIAL FURNACE FANS

EDITED TRANSCRIPT OF PROCEEDINGS

18 June 2010
Washington, D.C. USA

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I N D E X

BEFORE THE

UNITED STATES DEPARTMENT OF ENERGY

PUBLIC MEETING ON THE NOTICE OF AVAILABILITY OF A FRAMEWORK DOCUMENT FOR ENERGY CONSERVATION STANDARDS FOR RESIDENTIAL FURNACE FANS

Public Meeting was held pursuant to Notice at Room 8E-089, United States Department of Energy, 1000 Independence Avenue, SW, Washington, D.C., USA, commencing on the 18th day of June, 2010, at 9:07 a.m. ET.

TRANSCRIPT OF PROCEEDINGS

MR. BROOKMAN: Okay, let's, let's start, shall we? Please take your seats.

Good morning, everybody, and welcome. This is the U.S. Department of Energy's Public Meeting on the Notice of Availability of a framework document for energy conservation standards for residential furnace fans.

Today is Friday, June eighteenth. We're in the, Washington, D.C., at the Department of Energy.

My name's Doug Brookman from Public Solutions in Baltimore. Thanks for being here on

time.

We have a full day ahead of you I think. Let's start off by doing introductions around the room, your name and organizational affiliation.

09:08:56 To use these microphones you need to push the button and see the little LED green light light up. So, let's start up over here.

(Whereupon, self-introductions were had, after which the following occurred:)

09:10:29 MR. BROOKMAN: Thank you.

I'm going to do a very quick Agenda review and then we're going to launch into the program for the day. I think all of you received a packet as you registered today.

09:10:38 In that packet is a copy of the PowerPoint slides that will be the focal point for presentation and for discussion. In addition, there is the framework document and the Federal Register and Notice.

09:10:50 So, a lot of detailed information for you surrounding this Public Meeting. Immediately following this Agenda review we're going to have an introduction of Mohammed, Mohammed Khan, and then

there's an opportunity for brief introductory comments, key issues that any person here wishes to raise here at the outset, issues that you may wish to emphasize.

09:11:25 In addition, then, we move on to an overview on the regulatory authority and rulemaking. Moving on from there, scope of coverage and test procedures.

We'll take a break midmorning round 09:11:37 about 10:45 or so, then a description of, a, a continued description of test procedures. Following that, market and technology assessment, screening analysis, and engineering analysis.

Take lunch midday, 12:30ish or so, and 09:11:53 then markups for product price determination, energy use analysis, lifecycle costs, and payback period analysis immediately following lunch. And then we'll move on to shipments analysis, national impacts analysis, LCC subgroup analysis, and 09:12:06 continue on manufacturer impact analysis.

Then, utility impacts, employment impacts, environmental impacts, and regulatory impacts analyses. At the end of the day, around

about 3:00 o'clock or later today, we ex-, there's another opportunity for individuals to make closing remarks, other issues that they think they've not covered sufficiently during the course of the
09:12:25 meeting today.

So, that's the plan for today. We -- The agenda as written intends for us to adjourn at 3:45.

We'll go as quickly as we can, and as
09:12:35 efficient as we can. The Department sure does not wish to diminish anyone's capacity to comment.

Okay? So, then that's all I had to say here at the outset except that I'd just ask for your cooperation.
09:12:49 Please speak one at a time during the meeting today. Please state your name for the Record.

You don't need to say your organization each time because the Department knows who's here,
09:12:59 and at the end of the day it will distribute a listing, a photocopy of the business cards of the attendees. Please state your name each time you speak.

I wish to encourage follow-on comments in addition. That's helpful to the Department.

If you can keep your focus here, please turn your telephones and other devices on "Silent" mode. Please limit your sidebar conversations.

If -- These microphones work well. If you're going to speak, please make sure the green light is on.

And if you would, share the air time, please. There's a lot to be said undoubtedly today, and we'll try and be concise with our comments.

So, having said that, we'll turn it to Mohammed Kahn.

INTRODUCTION:

MR. KHAN: All right. Thank you, Doug.

Good morning, everybody. Let me first say that the Department of Energy is extra appreciative of your attendance this morning because this is the first opportunity or the first effort that we've taken on any kind of regulation for energy consumption or energy use for residential furnace fans.

So, your comments and input today are going to be very, very important.

Doug already covered the agenda.

John Cymbalsky, who is the new Buildings Technology Manager, is not able to attend today. He was going to say a couple of words, so I'm kind filling in, filling in for him right now.

So, again I want to say thank you for your attendance, and your comments are going to be very important. And what we're going to be covering today is the information that we provided in the framework document which has, or offers, or provides a discussion of the approaches that the Department expects to follow for its Standards rulemaking for furnace fans, as well as all the analytical approaches and assumptions associated or affiliated with the development of a test procedure for those products.

So, so again, thank you, and we're going to be looking forward for all of your participation today.

MR. BROOKMAN: Thank you.

OPENING REMARKS FROM INTERESTED PARTIES:

MR. BROOKMAN: Now is an opportunity for anybody that wishes to do so to make brief summary remarks here at the outset.

Diane first.

09:15:27 DR. JAKOBS: Hello. My name's Diane Jakobs, and I've been a (sic) active participant on the CSA C823 Committee from the beginning.

And I'd just like to say one of the things that concerns me is how complex it is, and 09:15:46 how difficult it will be for anyone to make use of the information that we provide. Today in the AHRI Directory we have a, a little "e" designation for electrically efficient furnaces.

And, and that's pretty straight-forward 09:16:04 because there's basically two classes of motors. And, and when you look at the efficiency of the, for furnaces, they kind of fall into two classes.

And in the, the Directory, we have a little "e," and we have nothing. So, it -- So, 09:16:19 it's easy to differentiate, whereas with C823, they tried to do the annual energy consumption.

And to look at a furnace for a whole year you have to consider what kind of

air-conditioning system is, it's used with, as well as the furnace operation. And furnaces are designed and operated with -- They have a, a lot of options.

09:16:45 So, you don't really know ahead of time how it will be installed, and it's very difficult to estimate what -- It depends on, you know, what part of the country, whether you, you're going to be in the north and have a small-capacity air

09:17:01 conditioner, or going to be in the south and high-capacity.

So, my concern all along has been that we're going to have all of this data and no one will know what to do with it. So, that's my

09:17:13 comment.

MR. BROOKMAN: Okay, thank you. Yeah.

Other comments here at the outset? Yes? No? No?

(Whereupon, no response was had.)

09:17:21 MR. BROOKMAN: That's it? That's all we -- Okay.

Then we're going to move straight to the education slides of -- No, no.

REGULATORY AUTHORITY AND RULEMAKING OVERVIEW:

MR. KHAN: Well, good morning again, everyone, and welcome. Thank you for participating in today's rulemaking.

09:17:51 Again, my name's Mohammed KHAN, and I'm the Department's Project Manager for this rulemaking activity. I'll be providing a brief overview of the rulemaking, and throughout the day we'll be hearing from analysts from Navigant

09:18:05 Consulting and from the Lawrence Berkeley National Laboratory on the proposed approaches and the various analyses the Department will be performing.

Purpose of our meeting: Today's meeting serves multiple purposes. Mainly our goal is to

09:18:28 have a two-way discussion.

We want to convey the key points and concepts associated with this rulemaking, as well as to hear and listen to your thoughts and potential concerns. First, the Department wants to

09:18:41 present the approaches and plans that it plans to implement in evaluating possible Standards for the furnace fans, and second, this is a forum for all interested parties to discuss and hear the issues

raised by DOE and by others.

And because your feedback is very important, I encourage everyone on fully participate. And I urge you to submit and, submit relevant data that will help the Department in this analysis.

And lastly, we want to describe the steps in the rulemaking process.

Comments: I said earlier it's very important. This slide represents a sample of the call-out boxes that we'll use to identify certain issues the Department seeks certain information on.

These boxes are in the framework document and will also be used throughout the day's presentation to help elicit your thoughts.

(Whereupon, Msrs. Burt and Bacchus conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. KHAN: All right. Again, your feedback is extremely important.

I'm going to keep saying that. I hate to sound like a broken record, but it really is.

I want to make sure that everyone is

clear on how to submit comments. This slide provides the postal, courier, and e-mail address which are appropriate for submitting.

Please include the information at the top of the slide so that it's properly identified and also catalogued. Also let me point out that the comment period closes July sixth, 2010.

Okay, now I'll talk about, briefly about some relevant statutory language. The Energy Policy and Conservation Act enacted in 1975 provides the legal authority and guidelines DOE must follow to promulgate the Standards.

The Energy Policy Act has amended EPCA to expand DOE's authority to specifically consider and prescribe energy conservation Standards and energy use Standards for electricity used for purposes of circulating air through ductwork.

In 2007, EPCA was amended again by the Energy Independence Security Act. EISA requires that the furnace fan Standards will be published by December thirty-first, 2013.

In addition, EISA requires that any new Standard after July first, 2007, must also address

standby mode and off-mode energy consumption.

Rulemaking overview: Okay, EPCA requires the Department to consider seven key factors when promulgating new or amended Energy Conservation Standards. This table lists those factors, and illustrates the pertinent, pertinent analyses the Department performs to address each of those factors.

09:21:30

Throughout the day we'll be describing the analyses in detail and should make clear the relevance and relationships between each of the analyses and the seven EPCA factors.

09:21:40

Here we provide a chevron chart illustrating the primary steps in this rulemaking. We're kicking off the rulemaking with the framework document and the public, and, and today's public meeting.

09:22:00

The framework document is published, or was published on June third and is available on line at the web URL at the bottom of the slide here. The document provides a discussion of the rulemaking process, and describes in detail the approaches, tools, and models DOE will use in its

09:22:10

analyses for Standards evaluations, and discusses approaches for the needed framework fan test procedure.

Next steps: As shown in the chevron on the previous slides, the next steps of the rulemaking is the Notice of Proposed Rulemaking, followed by the Final Rule. The NOPR will propose certain standard levels based on a completed analysis of the potential impacts on consumers, manufacturers, and the Nation as a whole.

The Department will also weigh the impacts against each other to determine the most appropriate proposed Standard level, and, of course, the NOPR will include a discussion of all relevant comments that were received.

In the Final Rule document DOE will discuss all comments received in the NOPR phase and will likely provide a revised or enhanced analysis stemming from any pertinent data that we receive. Again, DOE will weigh the impacts and determine the appropriate Standard, and the Final Rule will, will prescribe a compliance date for the Standards.

Any other questions?

(Whereupon, no response was had.)

MR. KHAN: Okay.

MR. BROOKMAN: Okay.

MR. KHAN: Thank you.

09:23:45 SCOPE OF COVERAGE AND TEST PROCEDURES:

MR. JASINSKI: Good morning. My name is Sam Jasinski, from Navigant.

Navigant is assisting the Department in this rulemaking development of the furnace fan test

09:23:58 procedure and analyses that will be conducted for the Notice of Proposed Rulemaking, or the NOPR. I'll start by discussing the scope of coverage.

The statutory language in EPCA provides DOE the authority to regulate any electrically

09:24:13 powered device used in residential central heating, ventilation, and air-conditioning systems for the purpose of circulating air through ductwork.

Furnace fans or the HVAC systems in which furnace fans are used will be referred to as

09:24:27 "furnace fan products," and these include but are not limited to all kinds of residential furnaces such as gas-fired systems, oil-fired systems, and electric residential furnaces, split-system and

packaged air-conditioner and heat pump air handlers, and modular fan coils.

Also is a preliminary list of devices DOE is tentatively considering to not be furnace fans.

09:24:42

The statutory listing in EPCA also does not specify which HVAC products utilize furnace fans, nor does it specify any range of characteristics such as rated air flow capacity or rated fan motor horsepower to aid in defining the scope of coverage.

09:24:55

As mentioned, throughout the presentation there will be items listed on which DOE seeks comment. The item numbers in the presentation match those that are in the framework document for your reference, and since there are quite a few of them I'll just briefly summarize the groupings and turn over the discussion to Doug for more details.

09:25:05

09:25:16

This first list is items on which DOE is seeking comment related to the scope of coverage, as well as how DOE is approaching applying the statutory language in EPCA.

MR. BROOKMAN: Yes. So, you can see the comment boxes listed there.

We won't read them. There are four of them.

09:25:38 Let's start with 1, scope of coverage, a very important issue.

Karim?

DR. AMRANE: Karim Amrane, AHRI.

We don't have the same understanding of

09:25:48 what EPCA says, what it says about, about the coverage of, of, of this proposed Rule. For example, I mean, heat pumps and air-conditioner system with blower coils, as far as we know, I mean, the energy consumption of the fan is

09:26:05 accounted for in the SEER calculation or the HSPF calculation.

So, I think it's clear to us that what Congress wanted DOE to do was to address the furnace fans, fan, and not the fan in the heat pump

09:26:21 or in the air-conditioning with a blower core. So, I'm not sure why DOE believes that it has that authority, but that's, that's a, that's not what EPCA says

MR. BROOKMAN: Thank you.

Other comments on scope? Jim.

MR. VerSHAW: This is Jim VerShaw.

I agree that if you start including things other than furnaces, then you start including the power that's already accounted for in the HSPF and SEER calculations. And you try to set a Standard around fan power at the same time you're setting a Standard for the whole system performance, I'm not sure which one takes precedence.

And seems like you're doubling, double putting Standards on two things that should be just one. So, that's why I agree with Karim that you really need to focus it back on furnace fans, and not have blower fans and coils.

MR. BROOKMAN: Diane.

DR. JAKOBS: And even more than that note, just air handlers with the furnace in the cooling mode. We -- When you have a match system, we're using that same air flow to complete SEER for the matched system.

So, so it should even be limited further

into just the furnace in the heating mode. Other than that, in the air-conditioning mode it's already, the electricity is already taken into account for the SEER calculation.

09:27:45 It's only in the heating mode where there is a, a gap and it's not accounted for.

MR. BROOKMAN: Okay, thank you.

So, just to complete the Record if we can, do we have any counterpoint at this point?

09:28:05 Charlie Stephens.

MR. STEPHENS: Charlie Stephens.

I, I kind of agree with those observations, but I will note that I just came back from the field two days ago from inspecting one of

09:28:21 those very same air handlers that's installed without a heat pump, without an air-conditioning outdoor unit.

It's feeding air to a water coil. Same unit, but it's not associated with the heat pump

09:28:34 outdoor unit or an air-conditioning outdoor unit.

I guess I'm kind of wondering how you would account for its efficiency in that kind of application.

MR. BROOKMAN: Diane, you can respond if you wish.

DR. JAKOBS: Actually, the way I read this I would assume it would be covered from this point of view as a, as a (sic) air handler. But, you're right.

If, if you assume that the scope of coverage isn't going to cover the air handler, then hydraulic air handler isn't covered anywhere either. And the, the, the units that are out today don't have a (sic) energy guide label.

And CSA C823, they also -- I'm on a committee for that one, too, for combo systems, and they're, they're looking at trying to calculate the efficiency for a whole match system, a water heater and a (sic) air handler, and for the test you put in.

And it's very -- It's a lot of testing for that product. But, you know, you're right; it's not covered.

MR. BROOKMAN: I want to make sure we're as complete as possible. Let me ask you to focus your attention on Item Number 3 and Item Number 4.

Karim, I wasn't sure you addressed these things, especially the interpretation of the relevant language of EPCA as excluding electricity used by draft inducer fans, exhaust fans, and heat/energy recovery ventilators.

DR. AMRANE: I didn't cover it, but I agree with your interpretation.

MR. BROOKMAN: Yes. Okay.

So, then we'll take other comments on 3 and 4, 4 being a comment whether DOE should include rated airflow capacity range or rated horsepower range to help define the test procedure applicability.

Diane.

DR. JAKOBS: So, I think that the rated air flow really is a better descriptor of how the, the blowers are used. And if you're just looking at the motors, the horsepower would be good.

But, the, the, the housing and the impeller make a big difference, and the CFM is really, is more descriptive of the fan, furnace fan assembly.

MR. BROOKMAN: Okay. Okay.

(Whereupon, at 9:30 a.m. ET, Mr. KHAN and Mr. Stas conferred, out of the hearing of others and off the Record, during which the following occurred:)

09:30:56 MR. BROOKMAN: I want to make sure we're complete here. This is important to the Department.

Any additional comments or counterpoints on, on these issues? Because we're about to move

09:31:04 on.

Ashley?

MS. ARMSTRONG: I actually have a question. So, for Number 4, for, if DOE should include or shouldn't include a rated airflow

09:31:14 capacity, what would you see that rated air flow range being?

MR. BROOKMAN: Diane?

DR. JAKOBS: Well, if, if we're just doing residential, I think you had a range in there

09:31:23 like 800 to 2,200.

MR. KHAN: Four-hundred.

DR. JAKOBS: Four-hundred.

MR. JASINSKI: Yeah, I think it was 400

to 2,200.

DR. JAKOBS: Yeah. I think if it's residential, that's probably the range.

MR. BROOKMAN: Okay, thank you. So, now, now we're going to move on.

MR. JASINSKI: Next I'll discuss the modes of operation for furnace fans to include active-mode operation, standby-mode operation, and off-mode operation.

Active-mode operation is the mode of operation during which the furnace is powered and the impeller is in motion.

Standby mode of operation is during which the furnace fan is powered but the impeller is not in motion. DOE believes that furnace fan standby consumption is indistinguishable from standby consumption of the furnace fan product because the furnace fan controls are typically well-integrated into the controls of the furnace fan product.

DOE also believes that this furnace fan standby consumption will be accounted for in the rulemaking for residential air-conditioning,

residential furnaces, and blowers.

The third mode of operation, off-mode operation, is the mode of operation during which the furnace fan product is not powered. DOE believes that consumers are unlikely to set their HVAC system, excuse me, to the "Off" mode.

Therefore, there will be no off-mode furnace fan energy consumption.

At this time DOE seeks comment on its assumptions about the electricity consumption in each mode of operation.

MR. BROOKMAN: Diane.

DR. JAKOBS: Sorry. I just want to point out that this is one point where you're different from C823, and it was something we talked about a lot.

But, for the standby mode, the ECM motors, because their control is active, they actually have a standby mode, but it's kind of a -- You could look at the control as being part of the furnace, which is what I think you intended it as, and then it ended up, because it was actually attached to the motor, they wanted to find it

there.

So, so I think that DOE's assumption makes more sense, but it's this contrast to what they, we did on C823.

09:33:29 MR. BROOKMAN: Okay. Thank you.

Thank you. Thank you.

Jim.

MR. VerSHAW: Jim VerShaw.

I agree with DOE that the standby power

09:33:37 of a component of a, of a, of a furnace which you're already going to do a standby of the furnace itself becomes irrelevant. Just do the furnace by itself.

MR. BROOKMAN: Okay.

09:33:51 Yes, Charlie.

MR. STEPHENS: Charlie Stephens.

I'm still going to be a little bit confused, though, when you use these things when they're not associated with a furnace, per se, a

09:34:01 gas-fired furnace or a propane, for instance. Again, I'm, I'm seeing a lot of these air-handler units.

I don't want to name brand names, but I

-- Fact is, there's a lot in my part of the world, variable-speed units that are going in just as a standby air handler feeding a third-party water coil, and there it is.

09:34:24 And when, --

(Whereupon, at 9:34 a.m. ET, Msrs. Burt and Bacchus conferred, out of the hearing of others and off the Record, during which the following occurred:)

09:34:28 MR. STEPHENS: -- when the consumer puts it in the "off" position, "off" mode, the transformer in that thing is humming away, and it is using electricity, some electricity. And, no, that won't be captured in some other Standards for

09:34:41 that unit.

So, I don't -- I, I think you're not going to meet the statutory requirement if you don't at least test these things and give them some sort of a mode, recognizing that that will also be

09:34:53 subsumed in another rating if it's used with a (sic) air-conditioning or heat-pump system.

Or, if it's in a gas furnace it may have the very same rating, but these things are used in

other places besides just air conditioning and heat pumps. And when they're out there, hundreds of them where I am use that way.

And that -- and it's growing fast. You have to account for these somehow, in my opinion.

MR. BROOKMAN: Thank you.

Diane?

DR. JAKOBS: I agree with you. But, what area are you from?

MR. STEPHENS: Pacific Northwest.

DR. JAKOBS: Yeah, okay.

MR. BROOKMAN: Pacific Northwest, says Charlie.

Go ahead.

DR. JAKOBS: But, those systems they have also have a pump, and to keep the water from getting stagnant, periodically the pump will run. So, it's not just the transformer.

So, it's -- Yeah, the hydraulic systems. Yeah.

MR. BROOKMAN: So, Diane, what would you suggest the Department do in this case?

DR. JAKOBS: The -- Well, what's really

hard about all this is that the fan is part of a system, and it's really hard to say, like, separate it from -- You know, it -- And it's not even just the air movement. It's part of the heat transfer system.

So, it's doing more than just moving air through ducts. And there's a lot of this overlap, so, so it's difficult.

Like I've said before, I thought the hydraulic air handlers would be covered, but till this second I, I forgot about the pump. So --.

MR. BROOKMAN: Yeah, at this early stage in these proceedings it's helpful for the Department if people can offer up prospective solutions. That's the reason I'm asking.

Yes, Jim.

MR. VERSHAW: Yes. Jim VerShaw.

Sounds like we're talking about a system where somebody's bought a water system and bought a coil and bought an air handler, and they're making a furnace out of it. Now, what is the energy conservation standard for that system?

Because it's not a lot of power that a

blower's going to use. It's maybe two to three percent of the total amount of energy that that water heater's going to use to heat the residence, and that water heater was probably purchased with 09:37:18 80 percent steady-state, with an energy factor of .8, .6, something like that.

What is it as a furnace? I mean, I think there's a gap.

There's a real gap in the way that the 09:37:31 Department is handling that particular system. And I think that the key for this is for the Department to look at this system, make sure that those things are really operated in the right way.

If, if it's being used as a furnace, 09:37:41 then, then I don't think it's an 80-percent steady-state report because it has a much higher stability. So, that efficiency goes way down.

Plus, it's using indoor air for combustion, not outdoor air. The whole thing is, 09:37:56 has got a problem; needs to be --

MR. BROOKMAN: Diane, follow-on. Then to Charlie.

Go ahead, Diane. Go ahead.

DR. JAKOBS: No, I've just -- I agree. I mean, it's, it's, it's a gap, and no one has suggested those systems should be 80-percent efficient, so --.

09:38:13 MR. BROOKMAN: Charlie.

MR. STEPHENS: Charlie Stephens again.

I think people are misinterpreting the kind of system I'm talking about here. I'll name some brand names; just no offense to anybody else,

09:38:23 because there are other brands out there.

But, I know the brands because I, like I said, two days ago I was inspecting it in the field. It was a Carrier FV4 air handler, variable-speed air handler running off a hydraulic

09:38:39 coil, third-party hydraulic coil with a hot- and chilled-water supply by a heat pump system, an air-to-water heat pump system.

So, that's what's going on here. There's no, you know, no combustion of anything

09:38:53 here.

It's just hot water and chilled water being supplied to a water coil on top, mounted on top of a variable-speed air handler, a standard

off-the-shelf Carrier FV-4 air handler.

So, you know, these things are, are happening out there more and more. And so the -- I think, you know, the FV-4 has to have some kind of a rating in order to be able to be used there.

MR. BROOKMAN: Okay.

Frank Stanonik.

MR. STANONIK: Frank Stanonik.

Is this a residential application?

MR. STEPHENS: And small commercial.

MR. STANONIK: Okay. But, this -- Right now we're looking at, at the moment, at a Rule that would cover -- My words here. -- a residential furnace or, or arguably a residential heat pump or residential air conditioner.

This, to me, sounds like a -- Again, I wasn't there, but sounds like maybe a multi-family kind of application, or something where you've got this central system feeding either cooled or heated water to maybe multiple air handlers. I don't know, but I don't think it's, I don't think it's currently within our scope of discussion.

MR. BROOKMAN: Charlie, go ahead.

MR. STEPHENS: No, it's a 3,000-square-foot house with -- I mean, an FE-4 is a residential product. I mean, it's a single-phase residential product.

09:40:13 It, it normally is associated with a heat pump, an outdoor unit with a heat pump, but not always. You can use it in other cases.

MR. BROOKMAN: Frank, go ahead.

MR. STANONIK: Frank Stanonik.

09:40:26 Where is the unit at that's providing the chilled or heated water? Is it a --

MR. STEPHENS: It's a heat pump. It's outside.

MR. STANONIK: It's --

09:40:35 MR. STEPHENS: How's that different?

MR. STANONIK: And --

MR. STEPHENS: And it's a, a fan. It supplies hot water or chilled water to a module or a tank, which is then routed to the air handler.

09:40:44 I mean, it's --

MR. BROOKMAN: Charlie, it seems as though you're describing something that's sort of an exception to this general description.

MR. STEPHENS: Except not where I live. I mean, where I live it's actually becoming, becoming rather common.

And it, it's growing. So, I think it needs to be considered.

MR. BROOKMAN: Okay, thank you.

Let me go to Greg.

MR. WAGNER: Greg Wagner.

When I'm looking at this whole set of discussion, the thing that's missing -- And you're asking for solutions, Doug. -- is you're, it's, it's talking about components versus talking about systems.

And what happens when you look at just components? You get some optimal system solutions.

And even in the case like this perhaps there needs to be a special rule for these type of systems that are outside of the scope of what exists today as far as rules and laws. And this kind of goes back to the original question of:

What are, what are we doing here as far as scope?

MR. BROOKMAN: Scope. Right.

Diane, do you want to follow on?

DR. JAKOBS: (Nodded no.)

MR. BROOKMAN: Okay.

DR. JAKOBS: Not this time.

09:41:48 MR. BROOKMAN: Okay. One additional comment.

I'm thinking we've covered this. Maybe we've covered it more than once, so we're about to move on.

09:41:54 You're next. Say your name, please.

MR. SMALL: Terry Small, Mortex.

I'd just like to point out that, much in the same way, on a large commercial job you have sort of the field and straw, different

09:42:06 combinations. I've seen residential jobs where you're taking a regular residential heat-pump air handler, you're putting a chilled water coil, a heating coil in it.

You've got an ice bank that, a tank for

09:42:24 chilled or ice-melt water. You've got a solar collector feeding the tank for solar-collected water.

It's all sort of fabricated and

installed on site in a, in a house. There are systems like this out there.

So, I think I agree with Greg. We've got to be careful here.

09:42:43 That's -- What's been described is almost something that's sort of a field-applied system, and I think it's going to be a very difficult area if you're going to get into that at this point. I mean, I think this -- We should

09:42:56 stick strictly to the conventional furnace and the, the fan once used by conventional furnaces.

MR. BROOKMAN: You okay?

Yes, ma'am.

(Whereupon, no response was had.)

09:43:08 MR. BROOKMAN: Okay, we're moving on.

Lane, please.

MR. BURT: Sorry. Lane Burt.

Just to be clear, I mean, the Statute says that DOE's supposed to find significant energy

09:43:17 savings that are out there, are technically feasible and economically justified. And if there is a segment, a large application somewhere in the country that's using things, even though they are

somewhat strange, it is up to the Department to assess that and set the Standards according to the Standards.

And just because it's a difficult problem doesn't mean it shouldn't be undertaken. And I appreciate that's --

MR. KHAN: Doug, Mohammed KHAN, DOE.

Before we move on I'd like to just revisit a point that Diane had mentioned. I just want to get some clarification, please.

We were talking about the issue of, I guess, characterizing standby mode, off mode in the context of the fan and, and the associated or affiliated controls. I, I, I think I heard you say that in Canada, with some of the, the furnace fans, the controls are built or are integral to the, the, the fan itself.

And, and if that's true, I just want to make sure that is that, or is that not also the case in the United States? Are we talking about something different here, or not?

DR. JAKOBS: No, actually it's the same products in Canada and the United States. It is

just on the committee for C823 we, we decided to account for this standby with the fan assembly, where I think here we're talking about there wouldn't be a standby mode.

09:44:46 If, if you just hooked up the, an ACM motor by itself and had it energized, there would be standby losses. But, the way the control -- There's a -- You know, you -- The -- There's two control boards, or three.

09:45:05 MS. ARMSTRONG: That's what I --

DR. JAKOBS: And one's stuck over here and one's stuck over here (indicating). Do you lump them all together, or do you parse it out?

MR. BROOKMAN: Ashley.

09:45:14 MS. ARMSTRONG: Yeah. I was just going to clarify.

I think what she means, for certain types of motors, those motors themselves have their own control boards in addition to the furnace

09:45:24 control board. When the system is hooked together, and when the furnace standby is in "Off" mode, test procedure is run, you can pick up both.

So, it's not that necessarily DOE is not

accounting for them somewhere.

DR. JAKOBS: Right.

MS. ARMSTRONG: It's just that we are, we are arguing that for furnace fan standby, that they'll be accounted for with the furnace and not the fan.

DR. JAKOBS: Right. And I agree with that.

MR. BROOKMAN: Karim?

DR. AMRANE: Right. And we agree with that.

MR. BROOKMAN: Thank you.

Frank, you okay?

MR. STANONIK: (Nodded yes.)

MR. BROOKMAN: Okay.

Okay, so now we're moving in --

Oh, yes. Molly.

MS. TROMBLEY-McCANN: Molly Trombley-McCann.

I wanted to ask some clarifying questions. So, in the case of an air-handling unit with an ECM and air-conditioning controls that isn't part of the furnace, the standby modes, the

furnace would not be captured anywhere.

Is that true? I'm wondering about systems and actual --

MR. VerSHAW: Well, -- Jim VerShaw.

09:46:14 You don't count an air handler with the furnace because the furnace has the blower in it.

MS. TROMBLEY-McCANN: Sorry. So, what I'm trying to ask is:

In the case where you have a system with

09:46:24 a (sic) ECM fan that is not coupled with a furnace, where does that control board go? And, is it captured in the standby modes?

MR. VerSHAW: It's in the product that has the motor in it. And when the, when the -- At

09:46:37 least for the product that's, that we sell, when the, when the Department goes and talks about supply losses for those systems, it will be involved in that.

DR. AMRANE: Right.

09:46:50 MR. BROOKMAN: Thank you, Jim.

Now Karim.

DR. AMRANE: Right. Last week we talked about it, and I believe what DOE has proposed it

will account for what you have.

MR. BROOKMAN: Okay. We ready now?

(Whereupon, no response was had.)

MR. BROOKMAN: Okay.

09:47:00 MR. JASINSKI: Next I'll be discussing the development of the furnace fan test procedure. Initially DOE is reviewing two approaches to develop a test procedure.

The first is to use the December, 2009, 09:47:11 draft version of Canadian Standard Association C823 as a framework. Please note that this, the, the, the Draft that we refer to is available on the Department of Energy web site.

In addition, this, please be aware that 09:47:25 the development of this procedure or this Standard is still in, in progress.

The second approach that DOE is reviewing is to use the blower electricity measurement, BE, which is specified in the 09:47:39 Department of Energy's residential furnace test procedure.

To begin, I'll go into a little bit more detail about CSA C823. The purpose of this

Standard is to develop an annual electricity consumption rating, or AECR ratings for air handlers that are, include that procedure.

Methodology to do so is a bit complex, and the following, the, the slides to follow will go into that in a little bit more detail. Also listed are the multiple existing industry test procedures referenced within CSA C823.

At this time DOE welcomes any comments on the use of CSA C823 as a framework, as well as any information about other existing industry test procedures that may be applicable to rating furnace fan performance.

MR. BROOKMAN: Diane?

DR. JAKOBS: I think I, I talked a little bit about it in my opening remarks, but one of the things with C823, we are very specific about the climate and the heating hours. And they have a little different way of doing heating hours.

I've -- We have different names, but the, we have maps. And the ASHRAE 103 or AHRI 210-45 show heating and cooling hours.

And the way they're computing that in

Canada is different, so, so that that, that there will have to be that adjustment. But, the thing that's difficult is that you get an -- Today for ASHRAE, ASHRAE 103 with the AUFE Standard, we calculate a use of AE.

And it's, it's a kilowatt-hour number, I guess, but they're all different. And you -- It depends on the capacity, and it's difficult to compare one unit to the other.

So, in my mind, this will give you more numbers just like that. And, and we're, we're not against -- We are -- I want to provide information that our customers will be able to use and will help them make the right application so they're happy with our products, but ASHRAE doesn't seem to be a useful number.

MR. BROOKMAN: Well, when you say "this" will give you better numbers, what, what, what are you -- What -- Be specific. What are you --

DR. JAKOBS: The idea of, like, 13 SEER, people seem to understand that; or 80 percent AUFE. And it doesn't matter what capacity furnace.

It doesn't matter, you know, if it's

upflow or down-flow, or -- You know, it's something that people can understand. And they can look at our ledger, and they can look at Ingersoll Rand ledger, and they can make a comparison, whereas
09:50:33 using this C823, it's going to be very difficult to make any comparisons.

You're going to have to -- We make a, a number of assumptions about the cooling capacity and heating capacity, and how the installation is.
09:50:52 And you -- We'll have to make that same number of assumptions to compare two units.

You can make kind of broad comparisons, but, but there are easier ways to do that, to make a, a broad comparison. If you want to be so
09:51:06 specific, it would really take a knowledgeable person to use the data that we're thinking about in CSA CA823 producing.

MR. BROOKMAN: Okay, thank you.

Okay? Karim.
09:51:21 DR. AMRANE: Karim Amrane, AHRI.

As Diane stated, we have some concerns about, about the CSA Standard. And several things -- the process, the content, everything else that,

that the Committee has produced, we have concerns with that.

And as an industry, we, we are exploring writing new test procedure for, for, for the air
09:51:46 handler. And we going to be starting the process probably next week.

We going to have initial meeting next week, and based on that meeting we make a decision on whether we can move forward with the, with a
09:52:01 Standard Project Committee. And if we do, we'll make announcement to, to everybody who is interested to participate in that committee.

So, it's going to be open to DOE, to anyone who is interested in that subject. So, more
09:52:13 to follow within a week or so.

MR. BROOKMAN: Thank you. And how long might that take, do you think?

DR. AMRANE: Well, that's going to be a good question. And, actually, I have a question
09:52:21 for DOE, because initially there was some discussion within DOE to combine the furnace efficiency Standard, the air-conditioning efficiency Standard, and the furnace fan efficiency

Standard into one mega rulemaking.

And we are on record to saying we shouldn't. We shouldn't include the fans within the furnace efficiency rulemaking because, according to EISA, DOE has until 2013 to issue the final Rule.

So, you have, you have more time than if you, if you combine the three together, which will force you to finish this, the test procedure and the efficiency Standard, before May of next year, and we don't believe that you have enough time to do that. So, so we would like you to decouple the, the furnace efficiency and the central AC efficiency from this rulemaking.

In doing so, you'll have more time and we will be then working with you and, and others to try to come up with a test procedure that is acceptable to industry and to everybody else.

MR. BROOKMAN: Okay, thank you.

Diane?

I would note that Karim's comment is responsive to Item Number 8, which requires about the existence and applicability of other industry

test procedures.

So, Diane.

DR. JAKOBS: Can I -- I want to go back to the second half of Item 7, where you talk about --

MR. BROOKMAN: Yes, please do.

DR. JAKOBS: -- AMCA 210 and ASHRAE -5. And CSA C823 does use those Standards, so the actual test procedure is something we've used for a long time.

And we all have equipment and we know how to run the test and we all have, we have data. So, that part of C823 is really good, and I would commend, you know, I would suggest that any Standard we have, we would continue in that, with that idea.

It would be consistent with this testing that we do for SEER, and that part of it makes a lot of sense to me.

MR. BROOKMAN: Okay, thank you. That's helpful.

Frank?

MR. STANONIK: Frank Stanonik, AHRI.

I've also got a question relative to this general question of the Canadian Standard or some other Standards. Does this necessarily have to be an either/or?

09:54:35 And what I'm thinking is the, a, a traditional gas or oil furnace. We have been measuring some electrical consumption of that fan since the first AUFE test procedures, and so this certainly has, let's say, some historical inertia

09:55:02 or whatever you want to call it to see if we can possibly amend that to make it fit what DOE's been asked to do.

But, on the other hand, there are some, for lack of a better word, separate air handlers

09:55:15 that, that aren't necessarily part of an air-conditioning system or not necessarily part of a, a manufactured heat-pump system or whatever. And in that case, maybe a Canadian-like test might be a fit or something.

09:55:37 And I -- And the reason I raise that is because when we, at least when I first heard about this, this activity up in Canada, my first thought is, well, okay, you know, I tried to get

clarification: Is, is a furnace an air handler?

Because in my own mind, the answer was no. I mean, since, since the dawn of furnace efficiency Regulations, gravity furnaces went out the window.

So, for the last, whatever, 30 years, furnaces have had fans. And to somehow say, "Well, we're only going to look at -- We're going to reclassify it as an air handler," it's like, "Wait a minute. It's a furnace, the whole system."

And so I guess I'm just thinking. Again, things have evolved.

We have other kind of systems. There are things out there that are nothing more than a box and a motor and a blower in it, and other things get added in the field.

And, and maybe other, a possible path is you have two procedures, one that just deals with what we've been doing on furnaces for 40 years, whatever number, and one that addresses the fact that this, this box out here that is now in use at the moment, and it has a blower in it and uses electricity.

And, and, I mean, the endpoint of this is to save energy, right? And at this point that box is unregulated, as far as I know.

I guess I'm, just want to maybe plant the seed that maybe, maybe it's not an either/or, but two procedures.

MS. ARMSTRONG: You going to answer that?

MR. BROOKMAN: Hang on. Okay, Jim. Yes.

MR. VerSHAW: Yeah. Jim VerShaw.

I think, I think the CSAl Standard started in the right place and then went awry. I think starting with ACRE was right, but then became a flawed and cumbersome procedure.

Then I think, I think as we get into various issues, as we get into various comments, you can see that there are quite a few things that are problematic.

MR. BROOKMAN: Okay. And that's an opportunity that you will be able to comment on later on.

Okay, I want to make sure we capture

that completely.

Jim Ranfone.

MR. RANFONE: Jim Ranfone, AGA.

Just a question about 823. And I think this is part of the confusion.

Are electric resistance furnaces included as air handlers in that document?

MR. JASINSKI: (Nodded yes.)

MR. RANFONE: Okay. So, the --

MR. BROOKMAN: Wait. Let's get an answer.

Were they?

MR. JASINSKI: Yes.

MR. BROOKMAN: Yes.

MR. RANFONE: Okay. So, they would be covered under 823.

How about the fans and motors from a fossil fuel? Were they covered in 823?

MR. JASINSKI: (Nodded yes.)

MR. RANFONE: So, that's all-inclusive then. And how do they distinguish the difference between an electric resistant furnace and an air handler that has electric resistance air handler?

MR. BROOKMAN: Let's let the Department respond.

MR. JASINSKI: I don't know that there's any distinction in CSA C823.

09:58:43 Diane, you can correct me if I'm wrong.

DR. JAKOBS: No, it -- For the test, we only operate the blower, so it doesn't matter where the heat or cooling is coming from. The only thing that's ac-, you know, activated during the test is

09:58:54 the blower.

MR. KHAN: I'll, I'll just add I think it's important to make, I think it's important to understand that, -- And, again, Diane, you can correct me if I'm wrong. -- that CSA C823 has made

09:59:09 it very clear that they're trying to, they're setting this performance standard separate from any -- It's entirely about the performance of moving air.

MR. RANFONE: Right. This is Jim

09:59:20 Ranfone.

And I think we get back to the original statements about the scope of this work. I thought that's exactly what DOE was saying was covered by

legislation.

I think we're maybe, you know, going off from, from different mechanisms here, or different methods, and I think we focus back on what DOE's
09:59:39 interpretation of the law is, that all these products are covered.

Now, we may find out that that's not true, but, I mean, at this point in time, 823 covers all that, and they're only looking at the
09:59:50 blower components, whether it's an air handler, furnace, gas, electric, or oil. That would seem to me to be the scope of the work that DOE's looking at, or what the legislation is intended.

Again, I don't -- I'm not an expert on
10:00:03 what the legislation says, but that would keep everybody on the same footing.

MR. BROOKMAN: Okay. Do you want to respond?

MR. JASINSKI: I think Ashley --
10:00:11 MR. BROOKMAN: Ashley does?

MS. ARMSTRONG: I don't want to respond to that one, but I want to go back to Frank's point about whether DOE could use something in the

existing test procedures.

And I'm assuming you're, you're going down the road of the BE, like the blower electricity. That, that, that's coming in about eight slides.

And DOE could do something like that. They could use components for CSA.

They could use something in between. So, if anyone has, you know, recommendations for something other than these two alternatives, this was just a preliminary review. We're obviously at this point --

MR. BROOKMAN: Yeah. Do you want to get them now, or in eight slides?

MS. ARMSTRONG: No, in, in a couple slides we'll talk about BE and a couple of modifications that temporarily could be.

MR. BROOKMAN: Okay.

I saw Greg first, and then back to Diane.

MR. WAGNER: Greg Wagner again.

The goal is to achieve maximum energy efficiency. One of the problems with the C823

proposed Standard is that it separates the function from the performance of the fan.

So, therefore, to a consumer, how would you know what you're getting for your use of electricity? You don't know how much cooling or heating capacity go along with that electrical consumption.

The separation of those two functions will not necessarily result in the maximum energy savings.

MR. BROOKMAN: Diane.

DR. JAKOBS: I just wanted to say that in Canada they have another mode of operation that's common, and for -- They, they tighten their homes and they need ventilation of air. And they'll duct a duct to the outside, and they'll use a continuous fan mode.

So, really, in Canada they'll use a furnace where the only thing they'll run it in continuous fan, so the only thing operating is that fan motor. And the -- You know, you're, you're not generating heat.

So, that's less common here. And so, so

from their point of view, you know, it's a valid mode of operation.

MR. BROOKMAN: Okay. I think I've got that.

10:02:21 Okay. Are we ready to move on?

Yes, Jim.

MR. BACCHUS: Jamy.

MR. BROOKMAN: Jamy.

MR. BACCHUS: Jamy Bacchus.

10:02:29 I'll just tack onto Diane's comment that in newer homes, sealed homes where you have better control of infiltration, we're seeing more of that latter case where you're running the fan in just continuous mode rather than cycling it on and off.

10:02:48 MR. BROOKMAN: Okay, thank you.

MR. JASINSKI: Okay, thank you. Now we'll get into a little bit more detail about the methodology that CSA C823 specifies.

The initial steps of CSA C823 specify

10:03:04 measurements of air flow and electricity consumption at various external static pressures for each available fan motor speed control setting. Once these measurements have been taken, CSA then

specifies to plot external static, and the results are performance curves as shown here.

Note that there's one for each speed-control setting. As has been mentioned, I think, DOE believes that this in, to some extent is already in, being used by manufacturers, by furnace fan manufacturers.

At this time DOE seeks comment on the methodology specified by CSA C823 to develop performance curves, as well as some of the operating criteria used to take those measurement.

MR. BROOKMAN: You can see the comment boxes listed there.

Diane.

DR. JAKOBS: Yeah, I agree that, that we do follow that methodology. There are -- We all have it in our specifications to give to the installer, give information to the installer.

We, we typically do it on the same increment of points. There is one difference: that PSC motors, at least for Rheem, generally go up to seven-tenths of an inch static, and some of the ECM motors, we've, we've gone further and given

information up to an inch of static.

So, there's, there's differences on -- We still recommend that you design the ductwork in the same way, but we recognize that people, the ECM motor will speed up, and if you have restricted ductwork you can get the air flow. And our customers have asked for information, and we provide it.

10:04:41

So, there's a little bit of variation there, but performing the, or providing the performance curve, that part's pretty straight-forward.

10:04:52

MR. BROOKMAN: Jim?

MR. VerSHAW: Yeah. We -- Performance curve generation is fine.

10:05:04

The, the number of points that, that CSA -- They're requiring increments of .1 inches of water power, and that's, that's twice as many as you need. You can go every two-tenths and be just fine.

10:05:21

And we've been doing that -- Well, 40 years ago my dad actually got a stoker, and he was pleased. So, -- But you don't get anomalies that

small amount.

Look at an ECM motor where it, there will be ability to go with three different air-conditioning capacities, and each of those has three different air flows, 300, 400, 350 CFM per ton, plus you've got heating. And if it's a multiple-modulating or two-speed, you've got a lot of points.

And so you've got to make sure that, you know, you're not overly burdening. We take it every two-tenths and we have data that shows all of our operation.

And I don't think that adding, adding double number of points I don't think is going to add any, any value at all.

MR. BROOKMAN: Two-tenths, two-tenths is based on your, your practical company experience?

MR. VerSHAW: Right.

MR. BROOKMAN: Thank you. Actually, --

MR. KHAN: Mohammed KHAN.

DOE appreciates the recommendation on the interval, but for the Record, I was wondering if we could hear from you maybe what you think that

range ought to be, as well.

MR. BROOKMAN: Jim.

MR. VerSHAW: We, we go -- We start at .1 inches static pressure and we go to whatever the, the system will provide. Now, on, on a PSC motor, eight-tenths, and depending on the system, on an ECM motor it's around an inch; not too much over that because the power just falls off in, in --

10:06:52 MR. BROOKMAN: Diane, do you want to comment?

DR. JAKOBS: Yeah. One of the -- We did some examples for C823, and we're fitting quadratic curves to do it.

10:07:03 So, theoretically you only need three points. The important part is to get the end point, the high point, the low point, and one in the middle so, so you're not extrapolating. But, --.

10:07:11 MR. BROOKMAN: Bryan, you want in here, Bryan?

MR. ROCKY: Yeah, Bryan Rocky.

To kind of counterpoint Jim as far as

the, the, the system curve performance, there is a little bit of an issue again, as our view is that C-, CSA C823 is very complex. And based on the control systems that are used with the furnace boards, especially as you get into modulating furnaces, you don't have necessarily three or four operating speed points.

Actually, in, in our designs you can have up to 100 individual calculated blower curves following this procedure. And that's a significant difference because of the way the furnace operates.

For PSE motors it's a three- or four-speed, or two-speed. No problem at all.

You get in with someone with the standard OCM, it gets more complex. And you get into the modulating furnaces, this, this approach starts to fall down really quickly just from the complexity.

From the size of the increments, I think I agree with Diane and Jim as well. You know, two-tenths should be very adequate for the application, and no more; with a maximum of no more than one itch for a residential application at any,

by any means, as far as the using, using them in this procedure.

MR. BROOKMAN: Okay, thank you.

Looking to the comment boxes, please do so. Please look at Slide 25 and make sure we've covered it sufficiently.

Anything else?

MR. JASINSKI: Doug, I'd just like to add.

MR. BROOKMAN: Please do.

MR. JASINSKI: Speaking to something that Jim VerShaw said about anomalies, I think that's something very important for our stabilization static pressure, electricity consumption, and air flow.

Does anyone that you know performs these tests have any input on what adequate stabilization criteria for those measurements should be so that if you are only taking two or three points, that you can have, that you can be very confident in those points?

MR. BROOKMAN: Jim?

MR. VerSHAW: Off the top of my head I

don't remember what it is, but there is, there is, and it's not 45 minutes. I mean it steadies out reasonably quickly.

MR. JASINSKI: Okay. I'll mention --

10:09:31 MR. VerSHAW: I'll put it in written comments. I'll --

MR. BROOKMAN: Yeah.

I see both Greg and Diane ready to respond.

10:09:33 MR. WAGNER: I was going to say, typically air flow measurements are made in, like, a-half minute to minute window, taking 30 measurements every so often and averaging them. Because of fluctuations in pressure you have to do

10:09:45 a time average, or sampling average, I should say.

DR. JAKOBS: Yeah.

MR. BROOKMAN: Diane.

DR. JAKOBS: We've done -- We have, we have some testing centers that are computer

10:09:57 operated and some manually operated. And I think we wait two inches for the one that no one is watching, to be sure.

MS. ARMSTRONG: Two, two minutes?

DR. JAKOBS: Two, two minutes. Thank you.

MR. BROOKMAN: Thank you.

DR. JAKOBS: Yes. And so if, if a person is watching it and can see, you know, the, level it out, they can go faster.

MR. JASINSKI: And how much are those measurements allowed to vary in two minutes? Do you know?

DR. JAKOBS: I don't remember exactly.

MR. JASINSKI: Is it based on a percentage or on, you know, a, a, a static pressure tolerance perhaps?

DR. JAKOBS: Well, they're watching CFM to find out.

MR. JASINSKI: Well, those are the things we're looking for in the written comments.

MR. BROOKMAN: In your written comments. Okay.

That would be helpful for the Department. Anything else on Item 9, 10, and 11?

MR. JASINSKI: I think, I think it's important to also focus on 11. I know that I think

we had some -- The, the gentleman from Johnson Controls mentioned that ECM motors have, when, when the manufacturer of the furnace fan gets them, the, the possibility of over 100 speeds.

10:11:01 Now, once, once these motors can be implemented into furnace fan products, do they still have 100 speeds, or, or --

MR. ROCKY: Let me, let me clarify. Bryan Rocky.

10:11:14 MR. BROOKMAN: Sure.

MR. ROCKY: In our particular design, we, our modulating furnace actually has 100 stages of modulation of heat. And in every case of that modulating and heat input, we are adjusting the fan

10:11:28 curve --

MR. BROOKMAN: Okay.

MR. ROCKY: -- to provide optimal performance.

Now, the other manufacturers who do

10:11:35 modulating furnaces do something similar, but not necessarily to that extent. But, for our product, that is defined as the way the system operates, and so in calculating the furnace operating point you

are going to have to calculate, we are going to have to calculate 100 operating curves for blower panel performance.

DR. JAKOBS: Actually, for, say, if it -- The way C823 is, it would only be the maximum and minimum for heating mode, and it would --

MR. BROOKMAN: Thanks, Diane. Yeah.

DR. JAKOBS: Cooling, if you had multi speeds, it's the maximum/minimum.

MR. BROOKMAN: Okay. Okay.

MR. JASINSKI: Thank you.

MR. BROOKMAN: Yes?

MR. JASINSKI: Um-hum.

MR. BROOKMAN: Okay.

MR. JASINSKI: Next after development of the performance curves, CSA C823 specifies derivation of the reference system load curve. The reference system load curve determines performance at common operating conditions to allow for comparison across products.

It's based on the governing equation Ps equals K time Q-squared, shown, as well as specified reference system operating criteria. The

governing equation describes the external static pressure piece of S as the function of the physical characteristic of the system, K, and air flow, Q-squared.

10:12:47 Reference system operating is the criteria specified in CSA C823, the achievement of 125 or equivalent, half-inch water column in the default heat speed setting. Uses these operating criteria, the specified operating criteria, and the

10:13:04 air-flow measurements that were used in developing the performance curves.

A value for K can be derived, and once the value for K is known, the reference system load curve can be plotted as shown.

10:13:15 (Whereupon, at 10:13 a.m. ET, Msrs. Burt and Bacchus conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. JASINSKI: Diana has a question.

10:13:22 DR. JAKOBS: One of the, the issues with this is in Canada it's a good assumption that the ductwork was designed based on the heating flow of the heating design. That -- And that's not such a

good assumption here.

It might be a good assumption in Chicago or Minneapolis, but certainly not in Arkansas where I live. And, actually, you know, my first impression would be that ductwork would be designed for the cooling mode.

That -- But, what we, we would -- You'd do a load calculation and you would determine what your cooling capacity was, what your heating capacity was, what the associated CFM was, and whichever one was the highest, that was, if you were starting from scratch, that's what you would design your ductwork for.

So, the problem with this is that you, we, we, the, the only point that is determined is on the heating curve, and then the rating curves are just kind of where you end up for the cooling. And what happened in the examples that I ran was that we ended up at statics that were beyond the manufacturer's recommended operation of the equipment.

And we had lots of arguments about what was the ductwork, you know, when you go out and you

test it. There's a lot of restrictive ductwork out in the world, and, or in North America, but it, it's a matter of: What, what are you trying to do?

Are you trying to describe efficiency when people don't follow the rules and don't have a good installation? Or, you know, are you trying to look at what's the efficiency when, when it's a good installation?

So, the half-inch, that would not be a good installation.

(Whereupon, at 10:15 a.m. ET, Mr. Rocky and Mr. Fowble conferred, out of the hearing of others and off the Record, during which the following occurred:)

DR. JAKOBS: We recommend two-tenths of an inch for the static.

MR. BROOKMAN: Knowing you're also implicitly recommending a default for the development, aren't you?

DR. JAKOBS: Yeah.

MR. BROOKMAN: So, state it plainly.

DR. JAKOBS: Oh, am I?

MR. BROOKMAN: Yes.

DR. JAKOBS: Yeah. Yeah.

If the Department would like to know what I thought, yes. And, actually, for C823, since the, the, the Committee has gone on and we 10:15:52 decided to use two static points, we, we actually did .3 and .6.

And we are going to show data from a recommended installation and the poor installation. So, we want to show people that it matters, you 10:16:07 know, and what, what is the difference in you, based on your installation.

So, that, that's a real issue. People can -- They're taking our wonderful equipment that we designed, and they're misusing it.

10:16:20 And they -- It's, costs them money and energy.

MR. BROOKMAN: Yeah. Got you.

DR. JAKOBS: And, you know. So, okay.

MR. WAGNER: I would also agree with 10:16:29 Diane on that point. Part of it, part of the recommendation is that you start codifying poor installations by recommending high static.

That's, that's, that's not a good

direction to go. We should be going in the other direction to force, or to help people understand that they need to use good installations, good practices.

10:16:51 Second thing, -- And this really has to do with, really, Item 13, I guess it would be, the system load curve. The problem is not all systems are the same.

AHRI reported recently back to the C823 10:17:05 Committee that, for example, in the cooling mode, that the CFM is between 400 and 290 CFM per ton. That's a one-and-a-half times swing.

If you use that squared function curve, you get significant increase in the amount of 10:17:21 pressure required, and up to three and a-half times the energy required, depending upon which end of that CFM-per-ton scale you're on. So, depending upon what the system is, you may have totally different ratings that would mislead the customer 10:17:36 as far as how they would use that product.

MR. BROOKMAN: Let's hear from Jim first, and then --

MR. VerSHAW: Yeah, Jim VerShaw.

The heating default doesn't match with any of the other conditions that we have to test furnaces under. And then it would inherently, because almost all furnaces that are installed with lower, or lower air flow or heating than cooling would inherently be above what we test air conditioners at.

And seems like if you're going to have it, seems you would not create different test points.

MR. BROOKMAN: What would you suggest?

MR. VerSHAW: Well, I'd like to see us match up with test performances for furnaces, which manufacturers watch static pressures they should be operated on if you retest. And that would be the condition that you would, you would run the blower at.

MR. BROOKMAN: Okay. Charlie?

MR. VerSHAW: And, in fact, take BE, which I think is appropriate way to do this, and, and have a watt, a watt, a watt number rather than a more complicated thing.

MR. BROOKMAN: Charlie Stephens.

MR. STEPHENS: Charlie Stephens.

We -- I've personally done quite a bit of testing of installed systems out there, most with air conditioning, but some without it. As I 10:18:51 recall -- I don't have the data with me, but I don't think we found any systems that were operating under .4 inches.

The coil in an air-condition system adds about .15 to .2 just all by itself, external to the 10:19:06 furnace. So, most -- The range we found most often was .4 to .8.

And a lot of them did cluster right around .5. So, I don't find that, at least out where I live, I don't see that a .5 is an 10:19:21 unreasonable number to be using for this sort of thing.

That's pretty much a weighted average of what we found. I find it in the field.

MR. BROOKMAN: When you say out where 10:19:29 you live, are you talking about Pacific Northwest, or all --

MR. STEPHENS: Pacific Northwest and, and a little bit of data in California that we've

been doing.

MR. BROOKMAN: Okay, let's hear from Molly.

MS. TROMBLEY-McCANN: Molly Trombley-McCann.

I do want to point out that I agree with Jim. That is, it doesn't make a whole lot of sense to have a different external static test point for a furnace fan and then a furnace fan operating with a furnace.

It seems a little bit of a disconnect. However, to Charlie's point, I think that a higher level than what is currently used in the furnace test procedure is more appropriate.

And while I do sympathize with the desire to not codify a bad duct design, the purpose of the Standard is to allow consumers to compare equipment as it will, will operate in their homes, and determine which is more efficient.

And if what we're seeing is that in actual operation there's high static, higher than what they're using in the test procedure, then that needs to be changed.

MR. BROOKMAN: Is it Cyril?

MR. FOWBLE: Cyril.

MR. BROOKMAN: Cyril, please.

MR. FOWBLE: Cyril Fowble, Lennox International.

10:20:22

I disagree with that. The purpose of the Standards and the work we're doing, I think we're getting into the weeds -- Not the weeds, but a lot of detail here.

10:20:32

This is, to use an automobile mileage analogy here, specifically I don't mean to be comparing, but you're not going to get 97 or 96 or 80 mpg in every engine in every car. Every engine depends on how they are each built and driven and a lot of other things.

10:20:46

I agree with Jim that maybe we should have a, you know, a common set, and if we're using Standard for heating, for example, saying we're going to be, to have .2 or 2 or 12, whatever the numbers are to be matched up to a furnace here, because all of this system we're doing with this is getting us, you know, it's like we're providing data.

10:21:00

And you'll need about a million points for every single application in, for the consumer. And the purpose of the Standard is not necessarily to give, you know, rating points for all the consumers, but to give them the ability to compare one model to another model, and, again, a specific set of conditions.

MR. BROOKMAN: Greg, and then Diane.

MR. WAGNER: To talk to -- What's your name again? I apologize.

MR. STEPHENS: Charlie Stephens.

MR. BROOKMAN: Charlie.

MR. WAGNER: Charlie. Said it enough times.

The, the issue of the higher static application --

(Whereupon, at 10:21 a.m. ET, Ms. Trombley-McCann and Mr. Burt conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. WAGNER: -- is often due to oversizing of equipment. In the Canadian rulemaking process it was reported that on average

the typical furnace is 80 percent oversized in application.

MR. BROOKMAN: Wow.

MR. WAGNER: With that 80-percent oversize, you take the numbers that these guys test their systems to -- We're just talking about the low static pressure. -- and it converts up, using that P equals K-Q-squared to get you to that .7, .8 in the field.

Changing people's behavior is not going to happen through trying to do laws that regulate the electricity. It's got to happen through other mechanisms.

So, just by rating it, you're not necessarily going to help the consumer in that way. You're helping the consumer to say, "This is good practice. This is what I should be doing."

And at the end of the day, that's what the DOE's telling us.

MR. BROOKMAN: Okay.

Diane.

DR. JAKOBS: I just wanted to say that, well, during the development of the Standard I

wanted to put some numbers to some of this. And I used some examples.

Carrier had offered to be an example, but then a PSA motor. And I used, I used someone else's that we had tested in our lab.

And it was kind of innocent, but we usually have this second curve as our heating speed. And I used that, and then it was pointed out that that didn't make sense.

But, it completely changed with the intersection with the other curves. So, it -- Someone could specify the heating curve that didn't really make sense, and control, you know, their rating points as it intersected the other curve.

So, this idea of it being realistic and, you know, is kind of like in the field and you get what you get. It, it might give more varied, and, and something that people could take advantage of.

So, I think we would really prefer a specific rating point.

MR. BROOKMAN: Okay.

DR. JAKOBS: You know. And part of all the calculations, I had to do curve fitting so I

could find the intersection of the lines.

And it's just a lot of complexity that wasn't really beneficial, I don't think.

MR. BROOKMAN: Jamy, let me hear from Terry Small, and then I'll come back.

MR. SMALL: Terry Small, Mortex.

The consumer has a lot of choices in, in reality in what's installed, including the indoor air quality devices, et cetera. So, you can, like, load up the static on the system, depending upon what the consumer's wanting in their system.

I really agree with several other comments, that we want a basis to compare these products. And I'd like to point out that three-tenths is used when testing a coil only in the cooling mode as an example of static in a system.

So, I think something like three-tenths makes sense to me.

MR. BROOKMAN: Thank you.

Jamy.

MR. BACCHUS: Jamy Bacchus.

I heard some comments made referring to

external static and to total static. Can we get confirmation that CSA C823, Section 89.2, is referring to total statics or external?

MR. BROOKMAN: I believe it's external.

10:25:04 DR. JAKOBS: Yeah, it's external.

MR. BROOKMAN: Yeah, I believe Diane says it's external, also.

DR. JAKOBS: Yes. For everything.

MR. BROOKMAN: Okay. Have we covered

10:25:13 this now?

(Whereupon, no response was had.)

MR. BROOKMAN: We're going to move on.

MR. JASINSKI: Okay. I'd just like to maybe ask Diane a quick question.

10:25:18 I know you said something like two-tenths is the --

DR. JAKOBS: That's what we're operating.

MR. JASINSKI: Well, it might be more

10:25:31 appropriate in the United States to use the cooling as the criteria. Are you saying two-tenths for the cooling, or for the heating?

DR. JAKOBS: No, I was talking about

two-tenths for cooling.

MR. JASINSKI: For cooling?

DR. JAKOBS: No.

MR. JASINSKI: Sorry.

10:25:41 DR. JAKOBS: Two-tenths for heating is what I was talking about.

MR. BROOKMAN: Yes, Molly.

MR. TROMBLEY-McCANN: Molly Trombley-McCann.

10:25:45 I just wanted to clarify, because I think what I said earlier might be misinterpreted. I'm not arguing against a single rating point.

My point was that the rating point should try to reflect as much as possible what most

10:25:59 customers will require for higher standards.

MR. BROOKMAN: Yes. Diane first.

DR. JAKOBS: Well, and the thing is, you get into all these details and you talk about this, and really there's just two classes of motors. And

10:26:11 it's only going to matter if you get an ECM motor or PSC motor.

And the rest is just kind of -- Someone said we were lost in the trees or the bushes or

something. I don't know.

But, you know, in the effort to be realistic, there's, there's so many variations that you have to account for before you can come up with a number that I don't -- It's not helpful.

MR. BROOKMAN: What Molly's trying to achieve is not doable, given the existing pieces that might fit together?

DR. JAKOBS: No. No, I think what Molly was saying, that we could just take a, a static point and that would be good for comparison, and it doesn't really matter if it's applicable in 85 percent of homes in the United States, or if it's in the north or the south.

If you have an efficient motor, you'll, you'll, you'll use less electrical energy. And it may -- Maybe I'm misinterpreting what Molly said.

MR. BROOKMAN: I'm trying to understand this myself.

Molly, please.

MS. TROMBLEY-McCANN: So, I think we agree on the principle of a single rating point. If we have to pick a rating point, what I'm saying

is we should try as best as possible to make it reflective of what the majority of costumers are going to experience.

I really -- There's no way to nail that down, because there is a lot of variability. But, to the degree that we have information about what that point is, we should be using it.

And the information that I'm seeing and hearing is that it's higher than .2.

10:27:39 MR. BROOKMAN: Diane, go ahead, and then Charlie.

DR. JAKOBS: The thing is, about choosing higher, higher points, is we go up to seven-tenths in our equipment on our airflow charts and then people want to know what, what is just beyond? And then we go up to one inch, and then people want to know what's -- You know, "I have this innovation. I want to go a little bit beyond that."

10:27:58 You know, "what happens then?" And, and in order to comply with, with what people want from the field, they want to use smaller diameter ducts, so, because they cost less.

And they want the air to blow and come out their register, so they want stronger motors. And as we give credibility to these points that are beyond where the equipment should be operating, it's going to be part of the specifications for a new design that the blower has to provide this much air flow at these higher statics.

10:28:22

And I think that's contrary to what we're trying to accomplish, and we'll use more energy that way.

10:28:34

MR. BROOKMAN: Got-cha.

Charlie.

MR. STEPHENS: Charlie Stephens.

I just wanted to clarify what we were doing out there, measuring all this stuff. In a lot of cases we were looking at what the real variations were from ECM motors.

10:28:42

So, we went out there to find out how they were really operating, because we were finding out that the savings were not what we expected. And the reason, the main reason they were not what we expected was because of external static in most cases.

10:28:53

If you could outlaw flex duct, and if you could outlaw these fans, outlaw the add-on filtration systems, which is also a lot of the reasons why a lot of these things are run 24/7, and you could eliminate bad duct designs, then you could probably find a lot of systems operating down in the .3, .4 range.

But, that's not what we found out there, and that's why we found that the statics from these variable-speed motors were not what they were expected to be. They were working pretty darn hard because they were working against all of these factors most of the time.

So, that's -- Whatever point we, we find here should represent reality. And, quite frankly, reality was not entirely what we expected.

But, when you think about it, I guess it makes sense.

MR. BROOKMAN: I think we're working our way towards a basket of solutions I think.

Karim.

DR. AMRANE: Just to follow up on this, on Charlie's point, yes, we understand that, you

know. And field installations have higher static.

But, that's where the focus should be. Let's make, let's make those ducts right.

Let's design them correctly. Let's design the static, reduce the static pressure.

We're always focusing ones on the equipment, but that's not where the focus should be. It should be on the duct itself.

Let's work towards reducing static pressure on the ducts.

MR. BROOKMAN: All right.

Greg.

MR. WAGNER: And I wanted to emphasize that that extra static pressure is due to this oversizing that often occurs, as much as anything else. And I'd like to see, you know, size comparison as to what's needed, you know, rather than just saying, "Hey, it had high static pressure," because, as I said, the study out of the, Canada was that they were running typically 80-percent oversize.

MR. BROOKMAN: Okay.

MR. WAGNER: In fact, the return time

above 50 percent of the capacity was in .05 percent of the time. So, it's, it's running, you know, at, at the, at that needed level of high demand very infrequently.

10:31:00 So, that extra energy that's being used is not, is not typical of how it operates, --

MR. BROOKMAN: Okay.

MR. WAGNER: -- or needs to operate.

MR. BROOKMAN: Final comment, Diane?

10:31:09 DR. JAKOBS: (Nodded no.)

MR. BROOKMAN: No?

DR. JAKOBS: No, thank you.

MR. BROOKMAN: Okay, we all set? Yeah?

(Whereupon, no response was had.)

10:31:14 MR. BROOKMAN: Boy, we're really getting into some depth here, I think.

MR. JASINSKI: Once the, the reference system load curve has been developed, CSA C823 specifies that it be superimposed on the

10:31:25 performance curves as shown here. The intersections of the performance curves and the load curve are references to operating points.

These operating points represent the

expected airflow performance of a system that meets the reference system criteria, and they are used to determine which electricity consumption measurements to use to calculate AECR.

10:31:44 (Whereupon, at 10:31 p.m. ET, Mr. Burt left the room, after which the following occurred:)

MR. JASINSKI: At this time DOE seeks comments on here. And that's a, a pretty complex graph, so if people want me to go back so they can

10:32:06 look at it a little bit longer, I can do that.

MR. BROOKMAN: Let's do go back. Yeah. Yes, Diane.

DR. JAKOBS: All right, this is for a PSC motor, and one of the things that came up a lot

10:32:20 in the CSA C823 was that our rating points were too low. And, actually, for a PSC motor, that's a conservative assumption, because if you look at the higher static, you'll end up with a lower, lower CFM, and then you'll end up with less watts.

10:32:43 More, more watts.

MR. WAGNER: Less watts. More CFM, less static, less watts.

MR. JASINSKI: I'll just make a comment

that this is not based on any data. This is just a representation of how they are used in comparison with electrical.

So, you know, it's not actually data. It's just sort of a, of a walk-through of how the curve is superimposed.

MR. BROOKMAN: Let's let Greg follow on.

MR. WAGNER: I was going to say, those are representative -- They're not representative of ECM blower time curves.

MR. JASINSKI: Okay, thank you.

MR. BROOKMAN: Is -- I thought you expected more than that in terms of comment.

MR. JASINSKI: Well, I think I can -- I think --

MS. ARMSTRONG: I think we kind of hit it.

MR. WAGNER: I was going to say, we've been commenting on this, but I'll go one more, in that the CFM varies by the product's capacity, also. So, therefore, these rating points vary by manufacturer, and you'll get a variety of energy consumption to meet different heating and cooling

demand points.

So, --

MR. JASINSKI: I think I can ask.

MR. WAGNER: -- it's not helpful to the consumers to understand those differences, I guess.

MR. JASINSKI: Sure. I think the important question here is:

Should we identify operating points by the performance curves, regardless of what they look like? Is that, is that an adequate --

MR. WAGNER: I've --

MR. VerSHAW: I guess the question is why, you know, if you've got, if you've got a furnace or an air handler, you want to go that way. And you've got the blower in there, and you say you want a single rating point.

Well, you've got one point. Why go through all this, all this?

I mean, -- And if you get to the next, next box that you're going to show in a minute, --

MR. JASINSKI: Okay.

MR. VerSHAW: -- it really gets complicated. And, boy, the consumer's really going

to get confused.

How many people in this room have bought a furnace in their lifetime?

(Whereupon, a response was had.)

10:34:39 MR. VerSHAW: Quite a few. You probably won't buy another one in your lifetime.

So, -- And we're all fairly technical. Imagine, imagine most people out there trying to buy a furnace, and you give them all of this stuff.

10:34:52 I mean, give them, give them a number. This one's higher; this one's lower.

MR. BROOKMAN: Jim, do the counterpoint. Why, why would the Department wish to do it this way?

10:35:03 MR. VerSHAW: That way?

MR. BROOKMAN: Yeah.

MR. VerSHAW: I don't know.

MR. BROOKMAN: I thought there was some logic that --

10:35:09 DR. AMRANE: Because I believe the Department is looking at what CSC has done, which, again, may not be the right ways.

MR. BROOKMAN: Got you. Well, I thought

that was a good question.

MR. KHAN: It was good. Thank you.

DR. JAKOBS: The people on the committee who proposed this, they were trying to be realistic. They don't like the static points we have.

They wanted realistic static points, and that, that's -- You get into all this --

(Whereupon, at 10:35 a.m. ET, Mr. Burt entered the room, after which the following occurred:)

MR. JASINSKI: If you want to try to describe the energy consumption of a (sic) actual installation, this is, this is what you need in order to do that.

MR. BROOKMAN: Molly, you want in here? Yes, Molly.

MS. TROMBLEY-McCANN: Molly Trombley-McCann.

Just in an attempt to answer your question, the, the issue is that, you know, a system doesn't operate at a single speed or a single load point for the entire year.

MR. BROOKMAN: Right.

MS. TROMBLEY-McCANN: So, to do this is to try to capture the fact that the speed and load vary over the year. Now, whether or not that exercise and complexity is worth it is a valid question, but that's why.

MR. BROOKMAN: Yeah. Got it.

Okay, Charlie.

MR. STEPHENS: Charlie Stephens.

This, I don't know how this is going to come out when we finally do the written comments here, but I, we have some fundamental issues with, with just electricity consumption at all, and why you would, --

(Whereupon, at 10:35 a.m. ET, Mr. Stas left the room, after which the following occurred:)

MR. STEPHENS: -- why you would rate this product using electricity consumption like a refrigerator, given that it doesn't operate like a refrigerator.

I mean if you come up with a number at one operating point, or, or multiple, even, the numbers you come up with will be only relevant to a

small subset of the consumers out there. They won't accurately reflect what the real consumer in Arkansas is going to see versus somebody in Montana using the same furnace.

10:36:57 (Whereupon, at 10:36 a.m. ET, Mr. Fowble and Mr. Rocky conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. STEPHENS: And so I don't, I don't

10:37:01 know that it's useful to come up with electricity number. I think it might be useful to come up with CFM per watts, or watts per CFM, or whatever you want; a rate that rates efficiency in trying to move air.

10:37:17 But, trying to interpret that on into a number I don't think is useful.

MR. BROOKMAN: Frank, I saw you. Let me go to Greg.

He's going to comment on Charlie.

10:37:25 Go ahead.

MR. WAGNER: Couple of things. First, a refrigerator is a stand-alone unit.

There's two fans inside a refrigerator,

blowing air, plus compress, compressors. We don't rate those components, and that's a good analogy for what we're trying to do here.

It's not looking at individual components to try to figure out how to make a suboptimal total system by optimizing individual components. And I think you can get a better way of achieving that.

By looking at that entire box as the refrigerator analogy was a useful one, but the person in Arkansas has different hours than the person elsewhere, so their energy use are going to be totally different based upon their hours of use in any house.

(Whereupon, at 10:38 a.m. ET, Mr. Stas entered the room, after which the following occurred:)

MR. WAGNER: So, the numbers are not going to apply to every single residence of every single region of the country.

MR. BROOKMAN: Okay.

Frank.

MR. STANONIK: We'll try and make this

quick. I haven't been involved greatly in the 283 stuff, but in my other, some of my other experiences there, there seems to be a, a general approach in Canada that they want test procedures that, in fact, do somehow estimate what is going to be consumed in the field.

10:38:38

10:38:52

10:39:05

10:39:21

We would strongly urge DOE not to fall into that trap. That's not even a trap; that's a quagmire.

The, the, the, the thing that should be done, and what we have historically done is you have test procedures that give rating points that establish relative merits of equipment.

In this particular case, this particular case, well, ultimately what's going to come out of this is a Regulation that's going to ask manufacturers to develop, at least design products that also have the potential to use less electricity to move air around, okay?

But, but the other -- You know, the significant factor in the field is the ducting. And the size of that is, the manufacturers have no control over that.

To write a test procedure that's going to ask them to try and somehow address and, and, and anticipate if, the variations and, in, in what actually is out there and somehow design for all of that, and, and then at the end of the day run these tests, -- and keep in mind, these furnaces, I mean, not to downplay, but we're only talking about the electrical consumption of the furnace.

The much bigger consumption is the fossil fuel, okay? So, we've got to keep this in perspective.

But, this is -- It is -- I don't know how to put it, but, but to start down the path of trying to write a test procedure that's going to predict what this appliance is going to do in my house or your house, or anybody's house, is, is just wrong.

It, it, it will not benefit anyone.

MR. BROOKMAN: Bryan, you want --

MR. ROCKY: Yeah. Frank just actually said, stated much better what I was going to state, some of the comments.

But, to come back to Charlie's

viewpoint, if you were to take one of our furnaces or air handlers in the Pacific Northwest, and you had the one neighbor that lived in a manufactured housing unit, and next to the neighbor that lived in a modular home, that, next to the neighbor that lived in a hundred-year-old home that was not built for air conditioning, versus the guy who happens to have a brand-new house, this approach can give me four different, very different results because just of the application of the same furnace or the same air handler, regardless of what Greg was talking about of oversizing factors; just from how the whole thing was put together.

10:40:47 10:40:58 10:41:12

And my test point is not going to cover those differences. Not under this approach.

At least I don't, we don't believe that.

MR. BROOKMAN: Okay. Have we covered this sufficiently?

(Whereupon, no response was had.)

10:41:21

MR. BROOKMAN: I think so. Okay.

MR. JASINSKI: Shown here is the equation for AECR. Again, it's a time-weighted sum of the electricity consumption measured in each

speed control setting's operating point.

So, first term of the equation, AHeatH, for example, is the annual heating hours. This is the number of heating hours in a year that the

10:41:45 furnace fan product per-, per-, spends performing the heating function in the default heat speed control system.

The next term, ECh, is the electricity consumed by the furnace fan while the furnace fan

10:41:59 performs the same function in the same speed-control setting. This is continued to account for all functions of the furnace fan, including reduced heating, cooling, circulation, and standby.

10:42:12 And the end result, of course, is the AECR, which is the annual, the total annual ener-, electricity consumed by the furnace fan.

At this time DOE seeks any comments on the AECR equation, as well as the methodology that

10:42:28 is used in CSA C823, or should be used to calculate those annual hourly multipliers.

MR. BROOKMAN: Jim.

MR. VerSHAW: I agree with Charlie that

there, you shouldn't be doing annual calculations. Not only does it include air-conditioning costs of, of energy, which is already part of another, another descriptor, but it, it, it, it -- You need to have a, a one-to-one comparison of CFM per watt or total watts for a given static point, because, you know, whether or not you have air conditioning or not, the house will exchange your static.

Sun load, what part of the country it's in, how old your house is, and all those things vary the operating, and you wouldn't be able to give a number that would make any sense.

MR. BROOKMAN: Diane, do you want to follow on?

DR. JAKOBS: Well, just kind of the details of the hours; that in Canada, they did a study of commercial loading, so when they talk about "annual hours," it's compressed. So, they don't talk about cycling.

We talk about our heating hours, and then we apply a (sic) oversized factor and a cycling steam, and then we come up with a real number of hours. This is already supposed to

include that, so when they talk about "heating hours," it's continuous heating hours.

And I, I agree with Jim. I mean, I was part of this, but I don't see how anybody would use it.

So, -- .

MR. BROOKMAN: Okay. Okay.

MR. JASINSKI: Thank you. Now we'll get on to the second approach, which is to use the BE measurement specified in the DOE test procedure for residential furnaces.

The purpose of this approach is to use metric, a metric and methods that are used in existing DOE test procedures to minimize the burden on manufacturers for tests and rating their products.

If necessary, the methodology to do so may include additional assumptions, assumptions and calculations to overcome some of the limitations of a BE-based rating, which we'll go into in this next slide. Also listed here is the Standard that's referenced in the DOE test procedure incorporated by reference in ANSI/ASHRAE Standard 103.

DR. JAKOBS: I have a question.

MR. BROOKMAN: Diane, go ahead.

DR. JAKOBS: We already published EAE. Why, why did you pick BE?

10:45:08 I mean, that's something that's part of the test, testing, something we measure, but EAE is already available.

MR. BROOKMAN: That is -- You think that's equivalent to BE?

10:45:21 DR. JAKOBS: Yeah. It has a few things thrown in there, but it essentially is the blower one.

MR. BROOKMAN: That's Lane.

MR. BURT: I just wanted to ask if you

10:45:30 could give an explanation of that.

DR. JAKOBS: It includes the user fan and the control. Is that, is it --

MR. BURT: Okay. So, it's the three?

DR. JAKOBS: So, EAE includes all the

10:45:43 electrostatic components?

MR. JASINSKI: Right. So, as mentioned early, during the scope-of-coverage discussion, the, the inducer fan system was excluded from the

rulemaking, and it's my understanding that EAE is calculated with that, uses the BE measure, as well as the electricity consumption of the inducer fan motor system.

10:46:05 So, I think that this is just, this is just a portion of the measurements used to calculate EAE.

MR. BROOKMAN: So, you need to characterize it differently. Go ahead.

10:46:15 DR. JAKOBS: Well, EAE is another attempt at yearly consumption, but B sub-, BE is just a steady state.

MR. KHAN: Correct.

MS. ARMSTRONG: Correct.

10:46:29 MR. BROOKMAN: Keep going, Sam.

MR. JASINSKI: Okay. As mentioned, BE, there are some limitations that may need to be taken into consideration if necessary.

The first one listed here, the BE

10:46:39 measurement is only specified for residential furnaces, not the other furnaces and products listed earlier. Another limitation is that BE is only measurable on a residential furnace, period,

the heating function.

This is while the burner is on, and does not account for electricity consumed by other functions such as circulation. Also, BE is only measured at minimal external static pressures for residential furnaces, and in only one or two speed-control settings.

So, this would exclude electricity consumed at other typical operating conditions, under other typical operating conditions as well as other available speed-control settings. Lastly, BE is a power measurement taken in watts, and should DOE decide to use an annualized metric, additional calculations would be necessary to convert this into an annualized metric in kilowatt hours.

At this time DOE seeks comment on the merits of using a BE-based rating, as well as whether or not and how you feel it can use methods to overcome the limitations listed.

MR. BROOKMAN: Diane.

DR. JAKOBS: One of the issues of looking at the fan by itself is that we're in the, we're trying to transfer heat, and turbulent flow

is good for heat transfer. It burns watts.

But, what we're really trying to, to do is get the heat out of the gas, the combusting gas or whatever the fuel gas. And if we have turbulent flow, we can make it a more compact heat exchanger.

We can get more heat for the natural gas that we're burning, and maybe we're using a few more watts. So, if you looked at a condensing furnace versus as noncondensing furnace there's more stuff packed into the knot, into the condensing furnace.

You're going to get higher furnace fan watts than for the condensing fan. No, I'm mixing it up.

But, anyway, I think you know what I'm trying to say; that a higher-efficiency furnace, because we have more heat exchanger in there, we're blowing air, you know, past a lot more stuff, we're going to burn more electric, we're going to use more electrical energy, but overall we're saving energy.

MR. BROOKMAN: Got you.

Jim?

MR. VerSHAW: Jim VerShaw.

I think if you go back to the four points on, on the previous slide, number one, first point would be we ought to be talking about furnaces only here, --

(Whereupon, at 10:49 a.m. ET, Dr. Amrane left the room, after which the following occurred:)

MR. VerSHAW: -- and makes that, then, a moot point.

The second one, we only ought to be talking about the heating force of, of a furnace, so that, that makes that go away. Again, if you're looking at, at a descriptor like BE, which is a, was a certain amount of power and certain condition, we could argue -- It's been argued about what static point that is.

Well, okay. If you don't, you change the static point, or you keep what it is, it, you still, you still have a number and, and it gives you a, a, a, a, an indicator where that's going to be.

(Whereupon, at 10:49 a.m. ET, Dr. Amrane entered the room, after which the following

occurred:)

MR. VerSHAW: And I'm not sure why. Again, we've talked about not doing the annual calculations because the broad variations of things that, that happened.

So, therefore, a descriptor like watts or OCFM per watt, or something makes more sense to me on this.

MR. BROOKMAN: Okay, thanks. And I appreciate you referring back to the bulleted points on 33.

Let's leave those up there and take additional comments on --

MR. KHAN: Hold off, Doug.

MR. BROOKMAN: -- BE.

MR. KHAN: And I just want to revisit a point again with Diane. It might be helpful to the Department if such data's available that characterizes -- You had said that, I guess, I guess for a given capacity of a furnace, comparing a condensing versus as noncondensing, the CFM requirement for the condensing is typically higher.

And so I was just wondering if there is

such data that, that we would be able to look at and, and characterize, I guess, the, the number of cases, or exactly how different that requirement is for the number of furnaces and models that are out there. That, that also might be helpful to us if such data is available.

MR. BROOKMAN: Diane?

DR. JAKOBS: We'll see if I can share with -- It's not data that we publish right now.

MR. VerSHAW: Is this -- This is Jim VerShaw.

It doesn't take more CFM.

DR. JAKOBS: Not CFM.

MR. BROOKMAN: Bryan, also.

MR. ROCKY: Yeah. Bryan Rocky.

Basically it's the impact of the secondary heat exchanger. More resistance to flow to maintain the same CFM to cooling or heating performance.

You have more resistance. Therefore you have to have more energy to get the, the same airflow.

You can look at the AEA calculations in,

that are already existing as part of the program and give you a, a, a basic comparison of the impact of electrical energy uses for condensers versus a noncondensing furnace today.

10:52:00 MR. BROOKMAN: Okay. Yeah?

MR. KHAN: That's it.

MR. BROOKMAN: You okay?

Terry.

MR. RANFONE: I thought maybe, as

10:52:11 somebody else has said, just expanding it to be a watts per CFM or CFM per watt. That way I think you'd pick up the, the differences between condensing and, rather, a conventional furnace.

MR. BROOKMAN: Jim.

10:52:28 MR. VerSHAW: Jim VerShaw.

One other comment. If you look at AEA you'll realize a, fewer operating hours of a given house if it's 95 percent, it will, versus a (sic) 80-percent furnace.

10:52:40 Therefore, the BEs may be higher for the one furnace than the other, but the number of hours is definitely lower because it's satisfying the same heat in the same-sized house.

MR. BROOKMAN: Molly.

MS. TROMBLEY-McCANN: Molly Trombley-McCann.

For all the reasons just stated, we think a watts-per-CMF or opposite is a better metric than an annualized metric.

I did want to ask, are there technical reasons why the existing BE couldn't be applied to an air-handling unit compared to --

10:53:12 MR. JASINSKI: In fact, there may be. A manufacturer may be better able to answer this.

I don't think there are any technical --

MR. VerSHAW: Well, we don't measure -- When you do an air-conditioner or heat pump, the amount of watts of the indoor fan is required to do, to give you the, the, the CFM per ton. Air conditioning at the, at the conditions we're operating at to give you the control and all that's a, all part of the SEER calculation.

10:53:38 MS. TROMBLEY-McCANN: Right. I'm just -- It's listed as a limitation, that these test procedures aren't applied to that equipment.

But, my understanding, there's no

technical reason why it couldn't. They're increasing, but it's not that they were applicable.

MR. JASINSKI: Not -- I don't know there are any technical reasons, but they are specified.

10:53:56 MR. VerSHAW: It would be the same as asking for a generator or alternator on your car to have a certain efficiency when you've got a miles-per-gallon rating already.

MR. BROOKMAN: Karim.

10:54:07 DR. AMRANE: We're getting now to a point where we are regulating components you have to, that are already regulated. You have SEER.

Now on top of that you want to regulate consumption of the fan, which is not what you do,

10:54:20 which is why we believe that it shouldn't apply to the air-conditioning part.

MR. BROOKMAN: Charlie.

MR. STEPHENS: Charlie Stephens.

I, I, I still think, however, that most

10:54:35 of the time you're not going to sell the, the, the alternator for the car separately and just use it all by itself. And in this case we've got a number of these products that are sold, in fact, without

the outdoor unit, and used all by themselves.

And they -- And what DOE is proposing here to do is rate their efficiency. I don't see a problem with that.

10:54:55 The fact that you use this thing that has a certain rated efficiency as a component of another system and they contribute to the rating of the system, I don't see a problem with that either. All the system has a rating, and it won't change.

10:55:09 You know, either this system qualifies or it doesn't. The effect would have been if you, if you set a Standard for this component that was more stringent than some of them could meet, well, then the number of combinations, outdoor and indoor

10:55:24 systems, would change.

There would be fewer. But, the ratings would not change.

They would be the same. So, I'm not seeing that there's a, that real big problem here

10:55:35 in rating these things, and I don't see that you're rating something that is a subcomponent.

These things are sold stand-alone and they're used stand-alone. You can use -- And, you

know, a furnace uses two kinds of fuel, two kinds of energy.

I don't see a problem with figuring out the efficiency about, with which it uses each other.

(Whereupon, at 10:55 a.m. ET, Mr. KHAN and Mr. Stas conferred, out of the hearing of others and off the Record, during which the following occurred:)

10:55:56 MR. STEPHENS: So, I don't see anything inherently wrong with the direction, but I think the metrics could be much better without disturbing some of the other ratings that go on when some of these things are actually used as part of the

10:56:08 system.

MR. BROOKMAN: Okay. Thank you.

You can see -- Go back to the comment box. You've got it.

Thank you. Look at Slide 34, if you

10:56:16 would, please, and make sure that you've covered them all.

See if there's anything else we need to cover at this point. We'll just pause for a

moment.

There are four separate boxes.

MR. KHAN: John TALBOTT.

MR. BROOKMAN: Yes, John.

10:56:45 MR. TALBOTT: John TALBOTT, representing NIST.

And the test procedures, there are some details in the test procedures that DOE would greatly like to hear industry's views and others'. 10:56:58 The BE as a measurement in the test procedure is pretty straight-forward.

It can be -- It's analyzed in the test procedures. And it's not just watts.

It's watt hours. And it has formulas 10:57:13 for getting to the, an annual and looking at that annual.

Could that be sufficient to regulate or to have an accurate rank order? The other idea is you're looking for something like an efficiency 10:57:25 measure in lieu of a bin-weighted annual consumption number.

The efficiency that's suggested is watts per CFM. You need -- CFM is not reported as a

result currently, so you need to think:

Do you want to take on the report of CFM as part of a test procedure amendment? And also think about: How is this going to work if you change the static pressure, which is a general consensus?

Let's change the static pressure. Well, in the existing test procedure the static pressure is specified and may be artificially low, but there's a temperature rise spec that everybody has to meet.

Then you're affecting AUFE, theoretically. So, think about how, if you were to change the test procedure, make it a little better so that you can handle this issue, think about maybe there's -- You don't want to test all the units all over again for AUFE.

You need to think about a grandfathering provision, and perhaps all new units go to a new test procedure. But, you need to get the relationship between AUFE -- You don't want to muck that up with a change in pressure on BE.

Thank you.

MR. BROOKMAN: Just to use a technical term there, right? Yes.

Go ahead, Diane.

DR. JAKOBS: No, I agree with -- I mean, we have tons of data on AUFE. People understand it.

So, when you start changing it, you just make it more confusing for people. And, and what is the benefit?

So, going back to in the directory for AHRI, we designate which ones are electrically efficient. And, and actually, the, the rebates are, are based on that.

The, the electrical energy is only two percent of the total energy use.

MR. BROOKMAN: Yeah. Okay. Okay.

DR. JAKOBS: You know. And that's straight-forward.

MR. BROOKMAN: I would imagine, yes.

MR. KHAN: Yeah. Before we take a break let me just be clear on one thing.

We have no intention to, to use a technical term, muck up AUFE at all. But, you

know, we introduced the concept of, of BE because it is something that's already established.

It's something that's already recognized. And to John's point, it doesn't mean that we couldn't, you know, maybe use some variant of the, of the protocol in measuring what BE actually is, but it's just something that we, you know, provide for in consideration.

MR. BROOKMAN: Okay. Final comments on this segment?

Because we're about to take a break, and I think, in fact, we're overdue for a break. Let's take a break now for 15 minutes, which means we'll resume at 11:15.

(Whereupon, at 11:00 a.m. ET, those present took a brief recess and returned at 11:21 a.m. ET, after which the following occurred:)

MR. BROOKMAN: Let's start back up. Okay, we're going to resume.

We're going to hear again from Sam.

MR. JASINSKI: Okay, I'll pick up where I left off and we'll continue by discussing some of the analyses that will be conducted for the NOPR

phase.

Here you'll see a graphic that illustrates where the NOPR falls in the rulemaking schedule, as well as the chevron that lists the analysis that will be conducted for the NOPR. First I'll discuss the market and technologies.

The purpose of the market and technology assessment is to characterize the residential furnace fan industry and any measures that can be used to increase furnace fan efficiency.

The market assessment characterizes the current market, manufacturers of furnace fans, historical shipments, commercially available products, and any existing regulatory or nonregulatory programs related to furnace fans, while the tech-, technical assessment is, the purpose of the technical assessment is to identify technologies that manufacturers can use to meet or exceed energy conservation standards.

At this time DOE requests comments whether the manufacturers of the furnace fans are also the manufacturers of the HVAC systems that utilize furnace fans, as well as any input that you

may have on some of the themes related to the markets, the furnace fan markets and the tech-, furnace fan technology.

MR. BROOKMAN: Who would like to start?

11:23:05 DR. JAKOBS: Someone else. Jump in.

MR. BROOKMAN: You've been doing really well. Keep going.

DR. JAKOBS: Okay. Rheem, Rheem does both.

11:23:16 We have -- We build our own housings and we purchase the impeller, many of them from Morrison, and motors, and, and put the combination. We've bought the housing and the impeller and applied the motor.

11:23:30 And, and I think even for some package equipment we buy the whole assembly. So, --

MR. BROOKMAN: Okay.

DR. JAKOBS: -- we do a whole variety of things, based on the cost, probably.

11:23:46 MR. STANONIK: But, the motor's a purchased component, right?

DR. JAKOBS: Yeah, generally we buy the motor separately.

MR. BROOKMAN: Frank, you want to follow on this, in this? We're looking for a characterization here, aren't we?

MR. STANONIK: Well, yeah. Frank Stanonik, AHRI.

I mean, I'm trying to understand the question in Item 21. I mean, I think Diane kind of covered it.

You've got the impeller.

MR. BROOKMAN: Is that, is that kind of a standard configuration? Is that what you're suggesting?

MR. STANONIK: Well, I guess I'm trying -- I'm actually trying to understand the question in terms of what you consider the manufacturer, because the furnace fan is basically the impeller, the housing, and the motor. And, I mean, ultimately they have to be put together to create the furnace.

So, you can say, yeah, the furnace manufacturer's manufacturing the furnace fan, but in many cases they may not have made any of the pieces. So, -- .

MR. JASINSKI: I think it's important.
MR. BROOKMAN: Go ahead, Sam.
Elaborate.
MR. JASINSKI: I think the, it's
11:24:45 important. The importance of this question is to
figure out who the burden of certifying and rating
the furnace fan will be, the manufacturer --
MR. STANONIK: That's the manufacturer.
The answer is "furnace manufacturer."
11:24:57 MR. BROOKMAN: Ashley? Go on.
MS. ARMSTRONG: To going further, who
actually specs out the design of the furnace fan?
So, does the furnace manufacturer spec the design
of the motor, or do they say, "I want these specs"?
11:25:11 Or, it's treated just as a purchased
part? That's what we're trying to understand, not
the relationship between these.
MR. VerSHAW: Jim VerShaw.
If you look at the competitive premise I
11:25:22 saw out there, you'll see almost identical wheels
for, in almost every one of them. And the
difference would be width and diameter.
And that, that particular wheel is

chosen because of its stability, its breadth of operating conditions, and the fact that you don't have to have really, really tight tolerances, and you can run it at, at RPMs that make sense for the, the application.

You do get differences from manufacturer to manufacturer on housings. Many of us make our own housing.

Some of us don't. Some of us do both, buy and make.

And now I forgot your question, so, sorry.

MS. ARMSTRONG: Motors.

MR. VerSHAW: Okay. So, so what we -- So, everybody -- So, so we, we will, we will, we will spec the speed torque curve on a motor based on performance that we determine because we know how.

We know how much air we need and we know how. So, we'll spec a speed torque curve, but we'll do tests to get there.

MR. BROOKMAN: Bryan.

MR. ROCKY: Yeah, Bryan Rocky.

There is one exception to this, that in the manufactured housing market there are blower kits for sale that are different from an application. It doesn't matter what furnace is actually used or initially implied to that installation.

But, based on add-on air conditioning typically that wasn't part of the original manufactured housing unit, the option to have a different blower housing can occur where the blower kit, the motor, the wheel, the impeller, as Jim's talking about, is designed as a separate assembly and may be what, manufactured by us, and may be put in a competitor's furnace, and vice-versa.

So, again, in that case you're defining the design to a set condition, not to the -- And relative the Application, not as part of the actual furnace eventually for air.

MR. BROOKMAN: Is it all specified how these components fit together?

MR. VerSHAW: Can you be, be more --

DR. JAKOBS: Yeah. Yeah.

MR. BROOKMAN: I'm just curious. Pardon

me. I'm taking us off course probably, but --

MR. VerSHAW: Well, in the design of a furnace, you, -- This is Jim VerShaw. -- you determine the amount of air flow you need at what static pressures you need to overcome total static, and it kind of determines the width and the diameter of the wheel.

And then from that you know what, what torques you need to run to get to certain conditions to keep inside the normal operating conditions. So, I mean, with respect to the speed torque curve or with an ECM motor, it's more of a program you need to get in, put in the motor to get there, and you know how much power it will take.

MR. BROOKMAN: Okay. Okay, do you think we covered this?

MR. JASINSKI: Yeah, I think one additional thing I, might be useful. Like Diane said, that for some packaged units you do purchase the whole assembly separately if you -- Maybe you could list some of the manufacturers of these assemblies.

Not necessarily which ones you use in

particular, but, you know, that may be something that would be useful for the Department for this particular assessment.

MR. BROOKMAN: Charlie Stephens.

11:28:26 MR. STEPHENS: Charlie Stephens.

There was one mention made here, but I think the manufactured-home market is peculiar, and, and I'm thinking you need to focus a little on that. They have some constraints that other people

11:28:40 don't necessarily have.

And they're -- They don't have as many as they used to have for the new product, but there's a ton of stuff out there that, a ton of these buildings out there that have a very

11:28:51 constrained space where all this stuff goes. And there's only a limited fraction of the manufacturers who are HUD certified to put that stuff in, and the new product.

And it's a peculiar market, is what I'm

11:29:01 saying. And I think you need to pay a little bit of special attention to that, or at least explore it so you understand what you're doing there.

MR. BROOKMAN: Okay. Jim.

MR. VerSHAW: Along that line as the requirements on SEER have gone up. The size of the coils required to make those numbers have gotten bigger, and the size of the house and the location that these things are installed hasn't changed.

So, what we're finding is you, the furnaces used to be 48 to 52 inches tall. And a few years back they went to 40.

Now 40's too tall for some applications because the coils are so tall. So, now, as we move forward to 14 and 15 and whatever on, on requirements, the furnaces are pushing down towards 30 now.

If you're going to put the same air flow through a small package than you are through a large package, it sometimes becomes very difficult to keep the same fan efficiency.

MR. BROOKMAN: Um-hum.

Okay, Terry.

MR. SMALL: Charlie's point I guess bears a little bit further explanation. We've been talking about furnaces in general, but, you know, we have all these different classes of furnaces;

you know, nonweatherized, weatherized.

And, you know, one of the classes is a mobile-home gas furnace, mobile-home oil furnace. And I think that the different styles of furnaces are going to have some different, probably, values in operating characteristics.

So, I'd like to make sure that, you know, DOE takes that into account when they look at these, at this, this rulemaking. Thank you.

11:30:37 MR. BROOKMAN: Thank you.

MR. JASINSKI: Thank you. One of the important outcomes or goals of the market assessment is to develop product classes.

DOE divides covered products into classes by the type of energy used, the capacity of the product, or any other performance-related characteristics that affects consumer utility. Based on these criteria, DOE could possibly use rated air flow capacity or motor, rated motor horsepower for the fan motor to differentiate between product classes.

DOE believes that rated air flow capacities for typical commercially available

furnace fan products, range from 400 CFM, cubic feet minimum, to 2,200 CFM in the highest feet settings. DOE believes that that rated horsepower of the fan motors used in commercially available
11:31:35 furnace fan products ranges from approximately a-fifth horsepower to, to a single horsepower.

At this time DOE seeks comment on the characteristics listed, as well as any others that could be used to differentiate between product
11:31:50 classes, as well as any additional information on how those characteristics can be applied, based on the product class criteria.

MR. BROOKMAN: Bryan.

MR. ROCKY: I'll go first this time,
11:32:04 Diane.

DR. JAKOBS: Great.

MR. ROCKY: Starting with the discussion of rated motor horsepower versus air flow, I think motor horsepower becomes an absolutely worthless
11:32:17 measurement as applied with any products, whether air handlers or furnaces in this case. The design of the equipment, as Jim was talking about with the, the system approach, would define the motor

horsepower needed at minimum, and most manufacturers will try to minimize that just because of the cost of the motor assemblies as you go up in horsepower.

11:32:35 So, air flow capacity of those two would be much better.

MR. BROOKMAN: Um-hum.

MR. ROCKY: Product classes, there are a lot of different comments already been made. One

11:32:45 obviously is, as Terry was following up, more home-manufactured housing applications have already been considered different product classes under DOE rulings on efficiency.

And I would propose that that is the

11:32:58 same situation for this ruling as well, just, just because of the application constraints, and also would say that a product class, as we have already discussed, condensing versus noncondensing, if we're driving towards a product class, CFM-type

11:33:14 approach could be justifiable as a product class just because of the offset of the higher efficiency on the combustion side versus higher watts to get that efficiency, as compared to the total energy

usage of the condensing furnace versus noncondensing.

MR. BROOKMAN: Thank you. Okay.

MR. JASINSKI: Okay. I think for clarity I'll just add a follow-on question.

I think that, as Bryan said, in the past for other rulemakings the product classes are application based. In this particular case, when you're dealing with a component that can be used in a lot of different HVAC products, I think it would be nice if we, we can receive comment on whether or not manufacturers of furnace fan products potentially use these same blower assemblies between applications; if, for instance, Manufacturer X uses the same blower assembly within one of their air-conditioner air handlers as they do in a gas-fired furnace.

Is that, is that the case?

MR. WAGNER: Usually they're different --

MR. ROCKY: They're different.

MR. WAGNER: -- because of design. And I do agree with what Rocky, --

Sorry.

-- with what Bryan said.

MR. ROCKY: Either/or.

MR. WAGNER: The horsepower rating, the horsepower nameplate ratings are, are selected not necessarily as specifics, but a number that's put on the nameplate. Just recently ran across a-half horsepower motor that was stronger than a three-quarter horsepower motor.

So, not a good, useful rating.

MR. BROOKMAN: Thank you, Greg.

And, Jim?

MR. VerSHAW: Jim VerShaw.

The furnaces are all 115-volt, single-phase. Air handlers are all, mostly 220 single-phase.

So, you'll have difficulty right there. You've got different housings.

You've got similar wheels. But, between furnace to furnace to furnace you have -- Somebody might use 11-inch diameter, somebody else might use a ten, somebody might use nine.

And the widths will vary. So, it's a

variation, but they're not the same.

MR. BROOKMAN: Thank you very much.

Diane?

DR. JAKOBS: If you just think of a heat pump with a, all you'd have is a, cooling coils in the system, whereas with, with a furnace you have the gas heat exchanger plus you have the cooling coil. So, the motors need to be more, be stronger for a furnace than for a (sic) air-handler system.

MR. BROOKMAN: Thank you. Very helpful. We have one more.

MS. MAUER: Joanna Mauer.

MR. BROOKMAN: Yes.

MS. MAUER: Is there a reason you couldn't describe, use an equation to describe efficiencies as a function of air flow as opposed to trying to come up with a different product class?

MR. JASINSKI: Well, I think it, it's important --

Diane? Did you --

DR. JAKOBS: (Nodded no.)

MR. JASINSKI: I think it, it's

important, what Diane, like Diane said, that the components that go into the, into the housing of the air handler or furnace have an effect on that which, I guess, would not be, would not be accounted for in a, in an equation like that.

MS. MAUER: So, then maybe within product classes, based on the type of equipment, you could describe an engine use as a function.

DR. JAKOBS: Yeah. Well, except we do different things inside our box, so I'm not sure that that would be --

MR. BROOKMAN: You're just, you're saying that product classes are not, you do enough different things that the product classes are not easily describable or discernable.

Ashley.

MS. ARMSTRONG: I guess the question for you, are you trying to say, like, you want an equation to characterize, like, watts over the full range of air flows? I mean, I'm confused as to what your two variables would be in your equation.

MS. MAUER: Well, either describing efficiency, some kind of efficiency metric or

energy use based on air flow, that it would change as -- And I don't know how it would change, or whether that it be possible to develop that type of equation.

11:37:13 MS. ARMSTRONG: I think -- This is Ashley.

It would depend on the metric based on the test procedure that DOE ultimately uses. But, if DOE finds that there's a reason to distinguish

11:37:22 product classes based on the number of factors, you could do it by fins, by single points.

You could do it by the equations. And it just depends on how the DOE is involved in there.

11:37:34 MR. WAGNER: And I would also add that as a heat transfer equation changes, the air flow changes. So, that's a another variable in this process.

MR. BROOKMAN: Okay.

11:37:44 MR. WAGNER: So, you've got mass flow equation.

MR. BROOKMAN: That was Greg. Now let's hear from Bryan.

MR. ROCKY: Yeah. Just one other comment was that in the framework document right before this discussed about high-efficiency furnace fans and the current usage, PSE versus ECM.

11:38:00 And it was stated that 95 percent of furnace fans were PSC motors, and as a result of the impact of the federal tax credits, utilities rebates, weatherization programs, the high-efficiency motors, the ECM usage has grown

11:38:20 tremendously and will differ based on which manufacturer you talk about.

But, in general, to meet higher, higher efficiency requirements, we are using ECMs to the point of it's not the majority yet, but it's headed

11:38:37 that way. I mean, we're well along the curve.

MR. BROOKMAN: Ashley.

MS. ARMSTRONG: No, I think that's okay.

MR. BROOKMAN: Okay.

Diane, do you want to add in here?

11:38:44 MS. ARMSTRONG: I --

MR. BROOKMAN: Go ahead, Ashley.

MS. ARMSTRONG: I guess the question would be, is: Are you using high efficiency? Is

that, is that distribution the same if we're talking about just the furnace, or if we're talking about the heat-pump markets?

MR. ROCKY: It -- As based as a percentage of sales, it is. It's applying to both air handlers for AC, and heat pumps, as well as furnaces.

11:39:02

And the, the distribution is completely skewed as the impact of the last two years versus what it was in the product-mix segment.

11:39:16

MS. ARMSTRONG: Um-hum.

MR. ROCKY: And I, I can't say if I can judge a, an industry standpoint, but I think you'd probably be safe to say somewhere, instead of five percent being in ECM, it could be anywhere from 15 to 35 percent, based on the product families and the manufacturer and the type of equipment.

11:39:30

And that's the market segment that is growing for all of the manufacturers. It's not the PSE motor applications.

11:39:43

MR. BROOKMAN: Terry?

MR. SMALL: I'd like to echo what Bryan just said. The differential costs between the PSC

motor and a brushless DC-, or an ECM motor is, is, is narrowing to the extent that, you know, I, I wouldn't think there are going to be any PSC motors of this type of application in ten years.

11:40:06 So, maybe by the time the rulemaking goes into effect there may not be any PSC motors being used, possibly.

The other, the other comment is that, remember that, particularly in furnaces or, or 11:40:19 really in air handlers, if they have strip heat, that the airflow, the safety operation of these devices is very dependent on the airflow. And the manufacturers will make their designs depending on the, the electric heating elements or the, the heat 11:40:42 exchangers.

It's not just about -- It's not always about optimizing the, the energy efficiency of the motor. There may be some safety concerns.

You know, you've got to be able to 11:40:53 design the product so that the limits work properly so if you have a motor fail, the limits operate properly and shut the whole system down.

MR. BROOKMAN: Thank you.

Bryan.

MR. ROCKY: Yeah. One other -- Bryan Rocky.

One other thing to, to note on this: that at low loads or partial-load conditions is where an ECM really gains its strength because of its efficiency. But, at the high condition, load, high-load condition such as full air-conditioning load, especially with the larger-sized units and four- and five-ton, for instance, you're already maxing out.

The ECM is not going to gain you that much more at those maximum conditions as a relative percentage as it will for the partial-load operation. So, it gets to be another interesting discussion about appropriate air flow and conditions when you're trying to put this towards the no impact on the system.

You can only spin these wheels so fast, and when you get to that maximum speed, you can't do anything more. You can't deliver that air, any more airflow than those wheels will deliver.

At that point it doesn't matter, almost

doesn't matter what motor is driving that system.

MR. BROOKMAN: Okay.

Yes, Jim.

MR. VerSHAW: I'm not sure what, what Terry was saying. We haven't seen the price differential between permanent magnet motors and, and PSCs declining.

It's still a pretty substantial three- or four-time multiplier on motor costs. So, I'm not sure that, that I've seen that fall off at this point.

It's a much more complicated motor. It has electronics built into it.

It's got responsive magnets in it. And at the same time, we have, we still have seen lower failure rates on PSC motors than we do with, with, with ECM motors, so that the homeowner then, when he has to, if it's out of warranty when the ECM fails, has substantial costs to replace that motor.

That wouldn't normally happen with PSC.

MR. BROOKMAN: Terry.

MR. SMALL: Just clarify what I said. Some of the brushless motors, obviously you have

the very high-end motors.

I believe one brand has gone to Version 5 now, with specialized wheel that goes with it. But, some of the ECM motors have been dumbed down with, with sort of fixed taps.

X-13 is, is one of the, one of the model numbers of one of the brands.

(Whereupon, at 11:43 a.m. ET, Dr. Amrane left the room, after which the following occurred:)

MR. SMALL: And it's those lower-end variations that I think have --

MR. VerSHAW: The high-end motors are still more expensive. They're fully programable.

But, there's an, been an effort to try to dumb down some of the motors to have something that's closer to PSC. And I think you'll see some of these lower-end ECM motors ultimately replace the motors at some point.

MR. BROOKMAN: Yes. Thank you.

Yes, Alex.

DR. LEKOV: Just, the speaker's indicated that the ECM motors are starting to take --

MR. BROOKMAN: Alex, turn your microphone on. Thank you.

DR. LEKOV: The speaker's indicated that the ECM having larger and larger market share, so it's important for the DOE calculations to understand what are the control schemes, particularly the replacement situations, when you go to put a new furnace in the house that has characterize as a bad duct system with the very high pressure loss.

And aren't there any controls limitation that's essentially rule out the deficiencies of the ECM working at very high pressure loss?

(Whereupon, at 11:45 p.m. ET, Dr. Amrane entered the room, after which the following occurred:)

DR. JAKOBS: I --

MR. BROOKMAN: Diane.

DR. JAKOBS: Sorry. Thank you.

We don't -- I don't think we have a limitation. Some of our higher-end equipment will offer diagnostics so the installer can see what airflow they're getting, but we don't, we don't,

like, shut down because the, the ductwork is too restrictive.

MR. BROOKMAN: Go ahead, Jim.

MR. VerSHAW: The next -- Jim VerShaw.

11:45:29 In terms of control schemes, if, if there, if there's so much pressure drop that the motor is trying to, it will, it will, it will, it will, it will try to, it will start ramping up in power usage, there's a point where it will start

11:45:44 falling off and you can't get any more out of it.

It's kind of a self-protecting thing so you don't get too many amps that, through the motor. But, the goal is to install a furnace and make sure it operates within the rise unit of the

11:45:59 furnace, because that's a safety issue.

Otherwise it won't operate appropriately. If they can't get within the rise range, then they shouldn't have that furnace in there.

11:46:07 But, there isn't -- I don't, I don't -- Typically you don't check the, the temp drop. Well, it, it has to be within the limits of the, of the, of the circuit breaker, but that's, that's as

far as it goes.

DR. LEKOV: So, to summarize, so there are no special controls that limit the CFM if the, for ECM motors if the pressure loss existing in the system is very high.

MR. WAGNER: There's, there's built-in protection. This is Greg Wagner.

There's built-in protections in the motor itself. The controls have power-limiting features that prevent them from going beyond a certain power drop.

So, whether it's a three-quarter or one-half, it has a watt limit that protects the motor.

DR. LEKOV: Okay, thank you.

MR. BROOKMAN: Okay?

MR. JASINSKI: Thank you. Next I'll go into a little bit more detail about the technology assessment.

The technology assessment uses information about existing or past technology options, as well as prototypes to, to identify technologies that manufacturers can use to meet or

exceed energy conservation standards. Note that DOE will only consider options that increase the efficiency of furnace fans.

However, here are the preliminary list of technology options which include high-efficiency furnace fan motors as well as improvements to impellers.

At this time DOE seeks comments on this preliminary list, as well as any other technology options that may be available for manufacturers to improve the efficiency of that furnace fan.

MR. BROOKMAN: Diane.

DR. JAKOBS: So, someone already mentioned the X-13 motor. I had asked that.

So, it has a brushless permanent-magnet motor, but it has speed caps like a PSC motor. It doesn't have the coil.

MR. ROCKY: Diane, I think, I think on the definitions ECM from those motor suppliers as long as it's supplied to PCM, that they will cover both?

DR. JAKOBS: That they're considered equivalent.

MR. BROOKMAN: Thank you, Bryan.

Yes, go ahead.

MR. WAGNER: I say he was, I was just going to comment on the text. In 3.271 there's a number of errors in the description of motors.

MS. ARMSTRONG: I'm sorry, which --

MR. WAGNER: The CP motors are not brushed motors.

MR. JASINSKI: Greg, before you start, I think we're aware of those technical inaccuracies and there's a new, there's a new version of the framework posted. It should be -- Maybe the wrong version got printed, but --

MR. WAGNER: I didn't review today's. The one I wrote my notes on, I didn't have time between 9:00 and 9:15, when we started.

But, I was going to say, there's a huge problem with that whole section of --

MR. JASINSKI: Right. Well, there's an updated section on, version on the web, and I believe Ashley may be able to provide an updated --

MS. ARMSTRONG: I'd -- I don't encourage -- You must have gotten it within 24 hours of it

coming out or something, the documents.

DR. JAKOBS: Of course we did.

MS. ARMSTRONG: Yeah. Yeah, you were waiting, weren't you?

11:49:10 There's a new version, and I would encourage you to look at that.

MR. VerSHAW: So, the June first is the most latest version?

MS. ARMSTRONG: June first is a version.

11:49:21 I can look at it and tell pretty easily.

MR. WAGNER: That's the one we got.

MS. ARMSTRONG: The one we got today is right. It's --

DR. JAKOBS: Well, there was a section

11:49:31 missing, and I looked at it, like, a line. But then I looked again and it was there.

So, maybe it has a same date.

MR. WAGNER: How do I tell the difference?

11:49:43 MS. ARMSTRONG: I'll come by and show you at lunch.

MR. WAGNER: No, I mean, they're both dated --

DR. AMRANE: The one-to-one is the only way.

MS. ARMSTRONG: The one is, they have on the web is correct. It --

11:49:56 MR. STANONIK: And the one they passed out today is correct.

MS. ARMSTRONG: Yes.

MR. STANONIK: So, your stapled one; not the one with the holes.

11:50:03 MR. BROOKMAN: Okay. Just to reiterate, comments on the most current version.

All right, Diane, go ahead.

DR. JAKOBS: Well, the other item on there, improved impellers. And there's been some

11:50:13 work on back-ordered wheels in, in the larger ranges.

Ingersoll Rand maybe has a ten-ton, but that, that hasn't really been shown to be as effective in the smaller diameters. And Ian Walker

11:50:32 did some work and had some, some good results, but the part of what Ian did was to make the clearances tighter.

And that will work with a forward-curved

wheel, too. You can do better if you pay more attention to how the air comes into the, into the fan and how close the walls are.

And so some other things that Ian had has, as highlighted in the papers he's written are applicable to both styles of motors.

MR. BROOKMAN: Okay.

Charlie Stephens.

MR. STEPHENS: Charlie Stephens.

I was going to echo that. I think there's, needs to be some third category here that has to do with the airflow path design, something along what Diane was saying, a whole new category.

MR. JASINSKI: Okay, thank you.

MR. WAGNER: Well, that would get into a system. This is Greg again.

MR. BROOKMAN: Yeah.

MR. WAGNER: That gets into the system; you know, the overall system as a box, not just a piece and rate it as a component. As I looked at your new version real quick, the last comment I'll make is on the PSC motors.

They're typically, like, 55-, 60-percent

efficient, not 34, 39.

MS. ARMSTRONG: Okay. Okay.

MR. BROOKMAN: Okay. Thank you.

MR. JASINSKI: Thank you.

11:51:53 Next I'll discuss the screening analysis. After completion of the market and technology assessment, DOE uses the screening analysis to eliminate technology options for downstream.

11:52:07 It eliminates it based on the four criteria listed here specified in Code of Federal Regulations. They're technical feasibility; practicability to manufacturer to install and service; impacts on utility or availability to

11:52:18 consumer; and finally, impacts on health or safety.

DOE welcomes comments on how to apply the listed criteria to the technology options discussed.

MR. BROOKMAN: Yes, Charlie.

11:52:37 MR. STEPHENS: Charlie Stephens.

One thing -- I, I don't know whether people are thinking about it, but new Standards for the motors for, for the PSC for actually horsepower

motors were just published in February, so you can -- You know, some of the motors will fall in those categories and you'll find minimum efficiencies there.

11:52:59 MR. BROOKMAN: Karim.

DR. AMRANE: Karim Amrane, AHRI.

But, it's my understanding that those motors do not, are not -- The motors used in HRC equipment are not regulated by DOE. Correct?

11:53:11 MR. JASINSKI: I'll refer to Ashley, but I believe that's correct.

MR. BROOKMAN: Ashley.

MS. ARMSTRONG: It is my preliminary understanding that Karim is correct, but we should 11:53:24 verify and, just to make sure. But, it was my understanding that the ones under the scope of this were not, were not affected by the small electric motor centers, but I could be wrong.

I'm not a motor person, so -- .

11:53:40 MR. BROOKMAN: Okay. Eric Stas.

MR. STAS: I'll check with Michael Kido --

MS. ARMSTRONG: Yeah.

MR. STAS: -- over lunch and try to clarify that.

MR. BROOKMAN: Thank you.

Okay, I --

11:53:49 DR. JAKOBS: One, one -- I've been working on comments, and when I looked at that it was, like, "Where's cost?" And I thought maybe it was under "product utilities," but then you go on and talk about cost separately. So --

11:54:03 MR. JASINSKI: Yeah. Cost, cost efficiency relationship will be developed in the engineering, which I'll discuss briefly.

MS. ARMSTRONG: Yeah, cost is not one -- This is Ashley.

11:54:13 Cost is not one of the criteria for which DOE considered in the screening, but cost justification is something that will be dealt with.

MR. BROOKMAN: Okay.

Other comments on this? Okay.

11:54:25 MR. JASINSKI: Thank you. Next I'll discuss the engineering analysis.

The engineering analysis is a key factor in setting the standards to estimate the increased

cost to manufacturers to produce higher efficiency products. The engineering analysis determines the relationship between cost and efficiency.

And these results are used in downstream analyses such as the life-cycle cost and payback period, manufacture impact analysis, and employment impact analysis. The engineering analysis begins by when DOE defines baseline models.

Typically baseline models are models that meet current energy conservation standards. However, because of no current energy conservation standards exist for furnace fans, DOE will select baseline models that are typical of the least-efficient, the furnace fans used in the least-efficient commercially available furnace fan product.

Once baseline models are defined, DOE then identifies, uses the market, market information from the market and technology assessment to identify efficiency levels that should be analyzed.

Then DOE performs tear-down, tear-downs of products at these efficiency levels to develop

Bills of Materials which act as inputs for a cost model that DOE uses to develop manufacturer production costs.

A little bit more detail on the tear-down portion of the engineering analysis. For -- During a tear-down, DOE physically disassembles a selected product during which it compiles information about the characteristics of each component, which include the, the process needed to manufacture or fabricate that, that component, and this information is compiled into Bills of Materials.

Listed here are the selection criteria DOE uses to decide which models of furnace fans to tear down. At this time DOE seeks comment on the approach used to determine the cost efficiency relationship, as well as the selection criteria used to decide which models to tear down, as well as any, any comments that you can, you can provide about energy efficiency trends based on the characteristics of furnace fans.

Some are listed here.

MR. BROOKMAN: Sam, which slide do you

think will provoke the most comment, 49 or 50?

MR. JASINSKI: Probably 49. I think it might be beneficial for them to see --

MR. BROOKMAN: That's what I think.

11:57:08 MR. JASINSKI: -- criteria.

MR. BROOKMAN: I'm hoping individuals can refer to it as, as they're making their comments.

Karim?

11:57:16 DR. AMRANE: Karim Amrane, AHRI.

I guess with respect to the cost efficiency curves, in order to, to derive them you, you need a test procedure first, right?

MR. JASINSKI: Yes.

11:57:27 DR. AMRANE: So, that's going to happen later in the process?

MR. JASINSKI: Yes. The test procedure rulemaking will be a separate rulemaking from the energy conservation standard rulemaking.

11:57:37 And typically they are scheduled so that a test procedure does exist before the engineering analysis occurs.

MS. ARMSTRONG: Whoa. Whoa.

MR. BROOKMAN: Ashley.

MR. JASINSKI: I said "typically."

MS. ARMSTRONG: There will be a, some type of proposal coming out, hopefully before, but if not, concurrently with, right? At the same time.

But, yes, the, the engineering has to be based on a metric, as does the rest. So, yes, some type of testing procedure with a metric has to be semi-determined or at least proposed, or for public comment in order to also do the analysis for the, for the proposal.

Yep.

MR. BROOKMAN: Greg.

MR. WAGNER: Yeah. I was just going -- I don't know how you get the one without the other.

I mean, it's like a circular kind of thing.

MS. ARMSTRONG: Yeah. Um-hum.

MR. WAGNER: We're trying to determine what that should be, but how do you get that baseline without knowing what testing should be?

MS. ARMSTRONG: Okay.

MR. BROOKMAN: Yeah. Okay.

So, I would refer you to the slide which is up there, 49, and you can see the various characteristics, considerations that the Department would like comment on.

Yes, Bryan.

MR. ROCKY: Bryan Rocky.

I guess my comment back to DOE is: How many different representative classes are we looking at here?

From the discussion we already had relative to applications, even such minor things as electrical power to, to, 220, 230 volt versus 115, if you're trying to come up with one or two baseline models, I could easily see that generating to ten or 12 or whatever.

The, the furnace fan assembly, as we've already discussed, is going to vary so widely between motors and wheels and blower housings as an assembly from manufacturer to manufacturer to applications. I'm not sure how, how you're going to try to narrow all this down.

What are you looking for for a, as

tear-down? What is the target number, I guess, as a representative baseline starting point?

MR. JASINSKI: Well, at this point DOE does not have, does not specify a certain number of tear-downs. Based on these criteria, we'll use the information from the market assessment to try to determine, you know, what, what is a sufficient number to meet these criteria and also represent the market.

12:00:17 To your other point, it's not necessarily -- DOE in the past has used representative product classes should sufficient scaling capabilities be developed. So, it's not, it's not certain whether or not DOE will directly

12:00:31 analyze each product class.

MR. BROOKMAN: Diane.

DR. JAKOBS: Thank you. You had said it was a least-efficient.

One of the things is there, for, in

12:00:47 packaging, is there are belt-driven blowers. So, you wouldn't take a belt-driven blower -- Would you? -- because it would be very inefficient, associated with the belt, --

(Whereupon, at 12:01 p.m. ET, Ms. Armstrong and Mr. Stas conferred, out of the hearing of others and off the Record, during which the following occurred:)

12:00:59 DR. JAKOBS: -- compared to the direct-drive.

Or would you? I mean, it seems like the worst may be very uncharacteristic of the whole market.

12:01:10 And, is there a limitation, maybe, to what --

MR. JASINSKI: So, I think, I think that that -- I think the selection of the proper product class criteria is, is what we use to try to avoid

12:01:23 situations like that.

(Whereupon, at 12:01 p.m. ET, Mr. Stas and Mr. KHAN conferred, out of the hearing of others and off the Record, during which the following occurred:)

12:01:27 MR. JASINSKI: And it's important to recognize that efficiency -- Going back to technology options, you look for, you look for technologies that substitute, that do not diminish

the utility to the consumer.

So, in the instances you bring up, and you may be able to correct me if I'm wrong here, but the application is such that you wouldn't be able to drop in a belt-driven to replace that direct-drive motor without compromising the utility or the application.

So, I think that that would definitely be considered in determining those technology options.

MR. BROOKMAN: Terry.

MR. SMALL: Just to point out as the importance of, of, you know, basically following product classes, if what you're saying, the baseline model is typically the least-efficient model in the market, for manufactured housing, very often the, the, the entry-level furnace might have a shaded pull motor for heating.

And, and if the consumer's in an area where there's heavy air conditioning, that would be replaced by one of these blower conversion kits, which would be a PSC motor, which would be obviously more efficient for heavy cooling usage.

So, I think your, your study needs to take that into account.

MR. JASINSKI: Thank you.

MR. BROOKMAN: Jim.

12:02:59 MR. VerSHAW: On, on the chart behind you there it says from the same manufacturer and product series. Is that saying you're going to use one manufacturer and product to --

MR. JASINSKI: No, no. We'll choose

12:03:14 difference models from different manufacturers.

Its also a criteria for models from manufacturers usually with large market shares and who would account for large shipment volumes.

MR. VerSHAW: You're probably not going

12:03:30 to see when you -- When you take the blowers out of, blower systems out of the furnaces, you're going to find you've got a bunch of sheet metal and you've got a motor. And you weigh the sheet metal and it's all going to weigh about the same for a

12:03:45 given capacity.

And the motor's cost can be different. And -- Unless there's some new things out there I haven't seen on residential-sized equipment.

MR. BROOKMAN: So, that would be a limited number of product classes.

MR. VerSHAW: Yeah. You're probably going to look at the difference of the motors.

12:04:07 MR. BROOKMAN: Cyril.

MR. FOWBLE: Cyril Fowble.

A little bit of kind of a process question here, kind of piggybacking on the, Karim's in regard to the test procedure to start evaluating

12:04:18 this. It sounds like we're in a rush to, to find a test procedure here, and I'm kind of curious on what the timing for this whole thing is, because according to the Regulations, you know, 2013 is the furnace fan, you know, Rule publication date.

12:04:32 So, you know, we -- Is that the date? Are we accelerating this?

I guess it's kind of, of -- I guess I'm worried about we're going to -- I guess my concern is we're rushing on making a decision on test

12:04:45 procedures so we can do a, an evaluation, versus getting a better answer, taking the time to get a better answer.

MR. KHAN: Mohammed KHAN, DOE.

We will have a test procedure in place before the Standards Rule is complete. And, you know, we certainly recognize the difficulties involved trying to get a test procedure done in advance enough of a standards process, but I, I guess the short answer is there will be a test procedure before the Standards.

MR. BROOKMAN: Let me refer you back to Slide 49 and additional comments on these criteria. Comments on how they might relate to DOE's construction of product classes?

(Whereupon, no response was had.)

MR. BROOKMAN: No additional comments.

MR. JASINSKI: Good. Thank you.

I'd also like to point out that during the engineering analysis, DOE does account for proprietary designs. Any tech -- Any efficiency level or standard level that can only be achieved with the use of a single proprietary design will be eliminated or rejected.

At this time DOE seeks any comments on information about the existence of proprietary designs that may meet this criteria.

DR. JAKOBS: I was just curious if it meant single motor design or if that was --

MR. JASINSKI: Well, I think, I think if, I think if there's a single motor design that there's no other motor design that can, can be used as a replacement to achieve the same efficiency, that could potentially be something that we should be, we, we need to be aware of.

So, if you know of a single-motor technology that DOE should account for related to proprietary designs, --

DR. JAKOBS: No, it was just Regal-Beloit provides a majority of the brushless permanent-magnet motors to our products.

MR. BROOKMAN: Nothing proprietary. That is so broad in its application -- Explain it.

DR. JAKOBS: Well, I mean, there's a motor part of it, but then there's also the software.

MR. BROOKMAN: Uh-huh.

DR. JAKOBS: And we don't really program the motor. We use the Regal-Beloit software, and the input we put in is more related to our

application, and not really controlling the motor.

So, where I've had, I've had vendors come from overseas and, you know, they say, "We can sell you this motor really inexpensively. All you have to do is design the control."

That was outside of our, our area of expertise, to design the motor control. So, that's a significant aspect of these brushless permanent-magnet motors, is the control.

Did I explain that okay?

MR. BROOKMAN: Yeah, I'm -- Yeah, I'm, I'm, I'm trying to -- I think it's --

Describe why you're asking this question one more time, Sam.

MR. JASINSKI: The reason for asking this question is to determine if there are proprietary designs that, that enable a certain, gain an efficiency that cannot be accomplished using any other technology or any other similar comparable design.

MR. BROOKMAN: And so far Diane has said not that she knows of.

MR. JASINSKI: Basically, a technology

that has no competition.

MR. BROOKMAN: Karim.

DR. AMRANE: But, you mean it exist, but we don't want one designed specially.

12:09:03 MR. JASINSKI: Exactly.

MR. BROOKMAN: Jim.

MR. VerSHAW: We, we could have one. We have a housing design that's patented that we use on air handlers, and that would be the type of

12:09:17 thing probably looking for here.

And that's readily available through the chain of commerce.

MR. JASINSKI: Okay, thank you.

MR. BROOKMAN: Okay. Additional

12:09:24 comments on this, on Item 31 as you see listed there?

(Whereupon, no response was had.)

MR. BROOKMAN: Okay. So, I think we're looking to lunch.

12:09:34 Yeah. Shall we break for lunch?

MR. KHAN: Yeah.

MR. BROOKMAN: Yeah, let's do that. We've really made progress with a -- We're pretty

much on, right on time; perhaps a little bit ahead of schedule.

It's now 10 minutes after 12:00. It takes just about an hour.

12:09:50 (Whereupon, remarks were made off the Record, after which the following occurred:)

MR. BROOKMAN: We'll resume at 1:10 in this room.

(Whereupon, at 12:10 p.m. ET, those

12:10:14 present took a brief recess and returned at 1:14 p.m. ET, after which the following occurred:)

MR. BROOKMAN: Okay, let's start. Okay, let's, let's resume.

And first off, Mohammed KHAN has an

13:18:22 answer to an earlier question from this morning.

MR. KHAN: Yeah, Mohammed KHAN, DOE.

There was a question earlier regarding the, I guess the scope of coverage of the recent small-motors Rule, and I got some information

13:18:39 regarding that. And according to the information I have, the motors that, that that includes are capacitor start and CS/CR, capacitor start/capacitor run, CS/CR, and polyphase motors.

DR. JAKOBS: Now, what were those?
MR. BROOKMAN: Those would be the ones that are --
MR. KHAN: These are the ones that are covered in the small-motors Rule.
13:19:05
MR. WAGNER: He was saying the, the designation. Now, those would not be typically used in furnaces of this nature.
This is Greg Wagner.
Those type of motors would not typically be used in residential type of applications.
13:19:16
MR. KHAN: Mohammed KHAN, DOE.
Just for clarification, I want to make sure that that's a statement; not a question to us.
MR. WAGNER: That's a statement. I'm sorry.
13:19:29
MR. BROOKMAN: That's helpful. That would test all of our knowledge of motor types.
MR. STEPHENS: Charlie Stephens.
MR. BROOKMAN: Charlie Stephens.
13:19:38
MR. STEPHENS: Yeah, Charlie Stephens.
I was the one that made the comment, but at the time the topic wasn't the kind I was trying

to suggest that those motors would be regulated, but that the evolution of those motors after the Standard would likely have some cost and/or efficiency impact on other motors that were
13:19:57 similar, based on my conversations with the, some of the motor manufacturers during the motors rulemaking.

So, they, they didn't say that they were the same motors, but they did say that they tend to
13:20:08 do things the same in some ways, regardless of, you know, whether it's covered or not.

MR. BROOKMAN: Okay. So then we're going to proceed.

We are moving on where we left off,
13:20:18 which is Slide 52. Alex Lekov.

MARKUPS FOR PRODUCT PRICE DETERMINATION, ENERGY USE ANALYSIS, LIFE-CYCLE COST, AND PAYBACK PERIOD ANALYSIS:

DR. LEKOV: Alex Lekov, Lawrence
13:20:26 Berkeley National Laboratory.

So, finishing engineering analyses and starting consumer impacts. So, for the life-cycle cost analysis there are several components.

We'll start with mark-ups. So, what's the purpose?

Determine consumer furnace fan prices based on manufacturing costs. Characterize furnace fan distribution channels and market segments.

The method DOE plans to apply: Estimate the consumer prices by applying mark-ups consisting of distribution channel mark-ups and sales tax to manufacturer sales-price estimates.

Just to put this in front, the method is very much the same as most you heard related to previous rulemaking and meetings you attended. So, the inputs for development of the mark-ups will be based on financial statements for wholesalers who will be using the most current available HARDI Profit Survey Report, and for contractors who will be using the, who'll be using the ACCA Financial Analysis for the HVACR Contracting Industry.

In addition, DOE will use the U.S. census data mentioned here. The mark-ups themselves will be defined in two categories, baseline and incremental mark-up.

And the baseline mark-ups relate price

to costs prior to a change in efficiency, and the incremental mark-ups relate the incremental change in consumer price to the incremental change in cost of goods sold.

13:22:33 This slide shows the distribution channels that DOE plans to assess. The upper part relates to the replacement market; the lower part to the new-construction market.

Basically we have furnace fan product

13:22:57 manufacturer, distributor, and mechanical contractor. Similarly, for the new-construction market, instead of mechanical contractor, looking at the general contractor.

And with that, DOE requests comments on

13:23:16 the planned distribution paths; also some feedback, as well as the feedback on the other mark-ups.

MR. BROOKMAN: So, you can see on the preceding slides, 53 and 54, the content that DOE would like comments on.

13:23:40 Bryan, you want to start? You gave me that look.

MR. ROCKY: Sure. Bryan Rocky.

As a distribution channel for the

furnace or an air handler, no com-, no questions, no discussions that need to be made. I think the model is appropriate.

As distribution channel for furnace air handler fan assembly, there are several things that have to come up. And there's -- That can make a huge difference to a cost to a consumer.

And that can be as -- Generally speaking, a consumer is only going to purchase a fan assembly when they have a failure and the unit is out of warranty, generally speaking.

There are appliances, or, excuse me, blower assemblies, fan assemblies that are sold in our industry from a motor manufacturer as a replacement or a fan kit, but that, relatively speaking, is very low volume, versus the entire product that's sold that uses furnace fans, either air handlers or furnaces.

And so now you're talking about a distribution channel that, if you're in a warranty situation, doesn't matter what the cost is because the manufacturer's going to replace it under warranty. And if you're in a nonwarranty

situation, the homeowner has very little choice.

Because of the design parameters, as we've already talked about, with motors, wheels, blower assemblies structured to the particular design of the equipment, you can't usually just go get a generic assembly to be replaced or to be bought to be used.

13:25:15

So, in those situations you're not going to go to use, you know, to Lennox to buy any fan assembly for a York furnace.

13:25:34

MR. BROOKMAN: There's another stop between the distributor and the mechanical contractor?

MR. ROCKY: It's -- You know, you're looking at distribution channels. And if it's a warranty replacement, it's to the manufacturer.

13:25:44

If it's a nonwarranty, it's still back to the original manufacturer. And cost of that component, it's up to what the market bears, not to a relative measurement because it's more efficient or less efficient.

13:26:02

It's: This is what has got to go into that product. So, your distribution parameters are

slightly modified.

Your cost parameters are slightly modified. You know, this becomes irrelevant in a lot of applications.

13:26:20 MR. BROOKMAN: You go ahead, Molly, please.

MS. TROMBLEY-McCANN: Molly Trombley-McCann.

So, I just wanted to try and clarify.

13:26:26 Does that mean that essentially your fan breaks, you go to a mechanical contractor and the mechanical contractor goes directly back to the manufacturer to get replacement parts?

MR. ROCKY: Yes.

13:26:38 MS. TROMBLEY-McCANN: Okay.

MR. ROCKY: I mean, you're going to -- A homeowner isn't going to purchase this. You're going to go to your contractor, to your -- The path is correct, but there's no choice.

13:26:49 There's very limited -- I mean, I can't go and, and for the most part get a complete fan assembly. You can get a replacement motor that are universal replacement motors.

You can buy wheels from different manufacturers, and generally they're going to be fairly close to the performance. But, we're talking about the fan assembly, the entire component: blower, motor, wheel, capacitors, the whole package.

There aren't a lot of choices out there, what's available. You go to the manufacturer; you pay what they charge you.

13:27:18 MR. BROOKMAN: Alex.

DR. LEKOV: Just so -- So, to highlight that, you emphasized -- And on the, in the replacement market you emphasized the case when basically the blower assembly will be replaced only. But, it also includes the case when the entire furnace product will be replaced.

So, as such, the furnace fan is, as part of the product, will go through the, this replacement channel.

13:27:53 MR. ROCKY: The -- Alex, the channel is correct, but the impact on it is, is almost nonsensical for a furnace fan assembly. People don't replace furnace fans because it's a more

efficient furnace fan, with very, very few exceptions, one being mobile-home add-on air conditioning that wasn't part of the original design being about the only application that I'm aware of.

MR. BROOKMAN: Okay, thank you.

Please say your name.

MR. GEE: Talbot Gee, with HARDI.

I wanted to just explain on this, and represent a distribution channel. I'd agree that the channel itself doesn't change.

I think the finer point on it is the mark-up analysis won't carry over like it would for other products here because, for example, if a York dealer, for example, is called in on a service call for a Carrier system and the furnace assembly is, needs to be replaced, that dealer may still be able to do the replacement, but that -- And they may be able to resource it from their traditional distributor.

However, the distributor probably had to go source that product from the original Carrier and, and work it that way. There's not the sort of

negotiated price, and, like you would have on a regular stocked product.

I think the channel is correct. I'd point out that if you're talking about "general contractors" meaning more like builders, they're not going to be playing in this market.

This is an after-market replacement mechanical contractor.

MR. BROOKMAN: Okay.

Jim.

MR. VerSHAW: Jim VerShaw.

If you get a failure on a replacement, I mean, most, most furnace manufacturers don't allow a different fan assembly to be put into their furnace because we're not sure the safeties will work. So, fundamentally, if you have got a PSC motor, you can get a PSC motor replaced, and that's pretty good.

But, if you have the other, you have to get the one that the manufacturer designed and programmed, because otherwise it's not going to work the same. So, it's going to be -- It's not quite straight-forward in that respect.

MR. BROOKMAN: Terry, go ahead.

MR. SMALL: I'd just like to point out that, again, the product class can be important here. As Bryan said, on mobile-home products, they go through a completely different channel.

The furnaces come out of a furnace factory like Bryan's with a heating blower in. They're installed in a mobile-home factory that builds the home.

They go out to the site, and if air conditioning is added, there could very well be a conversion blower kit that is coming from a distributor, along with maybe an air-conditioning coil and an outdoor air-conditioning unit.

So, just a point that I think the, the distribution channel can be quite different, depending on the product.

MR. BROOKMAN: Okay.

Diane.

DR. JAKOBS: I just wanted to say I heard a complaint from, that distributors don't always, because of the large number of motor programs, they don't always stock all of the

possible programs. We might, like, over the years probably have, like, 35 or something.

And then you'll have to have something sent air freight if you want to replace your motor for, you know, or wait a week or two. So, there's a complaint that they're expensive.

But, also you have to take this motor, you have to take, pay for freight, air freight to get it replaced in a timely manner.

13:31:33 MR. BROOKMAN: Okay. Other comments on these, these two slides?

Take a look at 53 and 54. You, you will note that the Department also requested comment on the mark-up slide, 53.

13:31:47 I guess if -- What would you say about that having the page that is missing? Okay.

DR. LEKOV: So, the next components are the energy use analysis. The purpose: To identify the energy use of furnace fans in the field, and

13:32:16 the energy savings potential of energy-efficient improvements.

So, here in four steps are outlined the preliminary methods placed essentially on the

furnace case. They -- DOE plans to estimate the household heating and/or cooling load using adjusted heating/cooling equipment energy use for RECS 2005; with the calculated heating/cooling load will determine that heating/cooling equipment operating hours.

The equipment operating hours means furnace end-product operating to estimate furnace fan operating hours at each active mode and with the fan operating hours, the fan electricity consumption will be determined for each considered efficiency level.

MR. BROOKMAN: Yes, Diane.

DR. JAKOBS: I was wondering. To do that, I would think you'd need to make some kind of assumption about the ductwork, what kind of static. And also, we've been selling ECM motors for many, many years, so I'm kind of split in the distribution of motors.

I look at the RECS 2005, and they talk about heating and cooling loads, and square feet. And I didn't see anything like that.

DR. LEKOV: Those components, the

analysis you mention will be applied. In fact, if you look back in the 2007, the Rule, those were part of it.

DR. JAKOBS: Oh, okay.

13:34:03 DR. LEKOV: We'll -- The DOE will apply all those considerations.

DR. JAKOBS: Okay.

MR. BROOKMAN: Okay.

Jim.

13:34:12 MR. VerSHAW: Jim VerShaw.

Once again, I don't think you ought to be looking at cooling as part of the energy you're saving, because if you switched motors, you switched furnaces, and therefore you'd probably go

13:34:26 to the, the Ratings Directory and find out the rating of that furnace with ECM, because those are usually rated because they're, they have a, they, they give you a higher rating than you can with a PSC motor.

13:34:40 So, again, I feel like you're, you're double-counting on the cooling side. You just want to focus on, on the heat.

MR. BROOKMAN: Okay.

Charlie Stephens.

MR. STEPHENS: I've -- Somebody can tell me if I'm wrong, --

Charlie Stephens here.

13:34:59 -- but I think the, the way I understood this is that you would have a diminished number of combinations for cooling for a heat pump system, say, or an air-conditioning system to choose from if, if a certain number of the indoor units were

13:35:15 too low in efficiency to qualify under the furnace fan Standard.

So, your choices as a replacement or as a new-construction piece of a system would not include combinations that had certain fans

13:35:29 associated with them. So, I think the savings would probably show up there.

Cooling, certainly, for a heat pump, because you, you can no longer select a system that -- I mean, you can take your savings however you

13:35:45 want, but it, it changes the range of savings.

There's some interaction here that I -- And this is why I think people can correct me if I'm wrong, but I don't think we've necessarily

established what the ratings would be for a heat pump or a, or an air-conditioning system if we used the actual performance of the air handler instead of the default values in the ratings that are currently used there.

MR. BROOKMAN: Jim.

MR. VerSHAW: The amount of power that the air, air handler uses in a, an air conditioner or, either heating or cooling mode, is included in the SEER. So, if you, if you assume that you're going to change a furnace fan, just put a furnace fan efficiency standard is going to safe electricity in the furnace fan, then are you going to increase the SEER requirements as a result?

Because you, you, we've got a minimum SEER that you have, and I think that's, as sold, meets that. So, the -- So, I think you, you'd be, be double-counting if you start looking at cooling.

MR. BROOKMAN: Karim.

DR. AMRANE: Karim Amrane, AHRI.

I guess, according to Charlie, I mean, for a heat pump and for, for an air conditioner with a blower core it's not the default value that

you use to calculate the SEER. You use the actual power of the, of the, of the fan.

So, so, it's not, it's not the default value.

13:37:11 MR. BROOKMAN: Charlie?

MR. STEPHENS: Charlie Stephens.

No, I actually wasn't speaking about the SEER rating. I go -- I was thinking about the hours.

13:37:21 And if you were calculating the actual energy use, like in a gas furnace, for instance, you have an EAE that's based on defaults.

MR. BROOKMAN: Okay.

MR. STANONIK: National average.

13:37:33 MR. BROOKMAN: Okay. So, any additional comments on this method that is described in Slide 57?

Yes, Cyril.

MR. FOWBLE: Cyril Fowble.

13:37:43 Only concern is similar to one that we've raised previously in other rulemakings about the, as -- I won't say "accuracy," but the, the reasonableness of that, of the RECS 2005 data.

There's been a lot of programs, tax, tax credits in 2005, -six, -seven.

We've had the big ones in the last couple of years with the significant dollars. I think, you know, that data's not going to include the shipments of high-efficiency blower systems of furnaces or air-handling devices.

So, we talked about the RECS 2009 data, whatever, but certainly a more recent version. Or look at HRI shipments or something like that to determine the increase to actually reduce the amount of energy consumed today for furnace fans.

MR. BROOKMAN: Okay, thank you.

Greg.

MR. WAGNER: Greg Wagner.

There was discussion here that the remaining hour's going to be assigned to the continuous-run, continuous ventilation. If you do have that, then I guess what's the point of standby power?

And, and probably it was in the, in 7.2. It's not on the slide, but it was under the description of how the evaluation was going to be

undertaken; that there will be heating hours, cooling hours, and the remaining would be ventilation.

If you do that, then there's no time for standby, I guess.

DR. LEKOV: And as I explained this morning, DOE does not plan to assess the standby power.

MR. WAGNER: Okay. So, the rest of it will be in continuous run?

What portion --

DR. LEKOV: That's in --

MR. WAGNER: What portion of the population does operate in continuous mode?

DR. LEKOV: DOE plans to determine this.

MR. WAGNER: So, that will be part of the Rule, to identify the portion of that?

DR. LEKOV: Obviously, yes.

MR. BROOKMAN: Final comments?

(Whereupon, no response was had.)

DR. LEKOV: So, those are the DOE's comments, requests for comments. So, one of the comment was the planned approach for determining --

I believe we got some comments, and the other one is:

Usually for this type of equipment DOE also looks at potential rebound effect, and wonders, in the case of furnace fan, whether such, such thing as a rebounded effect should be considered separately for this product, just to remind that it's going to be applied for the furnaces and for the central AC.

13:40:31 MR. BROOKMAN: Frank?

MR. STANONIK: Just a, a quick comment on that. I mean, the, the, in the case of the furnace, the rebound effect is theoretically driven because the consumer wants to be more comfortable, and so, since they have perceived that they're using less energy, they turn up their thermostat to be warmer.

I think the question that somehow the consumer's going to react because their blower is using less electricity and somehow be some rebound effect is, it, there's no connection there. I think in this particular analysis there isn't.

You know, the idea of rebound doesn't

fit.

MR. BROOKMAN: Diane.

DR. JAKOBS: I, I found a report from Wisconsin, and it was April, 2009. But, but they said that there was a rebound effect in respect that people go from not having, using continuous fan, to using continuous fan.

So, they were saying that the, if you replace a PSE furnace with an ECM furnace, and you switch it to continuous operation, you're entirely negating the energy use, and energy use actually increases.

DR. LEKOV: If this is --

DR. JAKOBS: So, if that's --

DR. LEKOV: Just a question. If this is related, Wisconsin report relates to the entire fan product, or to the fan itself?

DR. JAKOBS: They had -- They were just monitoring furnaces with ECM motors.

MR. BROOKMAN: Right.

DR. LEKOV: I remember the earlier version of the report, the, the 2003, and all the assessments were related to the furnace fan as

opposed to the entire furnace. So, I wonder about this.

DR. JAKOBS: Oh, I, I --

MR. WAGNER: Either way, it's part of the furnace and its use, and the report was about use of the furnace in, you know, people's homes, and what they've done. And that gets back to the question I asked a moment about, ago about continuous run.

If you're considering them to be continuous run, there won't be any rebound effect because there's no more hours to be run in a year. And so it's another -- One way or another, I guess, I really need to have an understanding of what the percentage of folks do use continuous-run versus noncontinuous-run users, --

MR. BROOKMAN: Okay.

MR. WAGNER: -- because it's 2,000 hours, more or less, heating/cooling; 6,000 hours continuous run outside of that, or --

(Whereupon, at 1:43 p.m. ET, Mr. Wagner and Dr. Jakobs conferred, out of the hearing of others and off the Record, after which the

following occurred:)

MR. BROOKMAN: Okay. Okay.

DR. LEKOV: Focus on the entire scope of the life-cycle costs and payback period analysis. So, here is a slide explaining the general approach.

So, the purpose is to assess the next life-cycle cost impact and the payback for the consumers of residential furnace fans under the considered efficiency levels. And the method essentially is what it does is equals the cost to install, plus the sum of operating cost was discounted to the particular base year.

(Whereupon, at 1:43 p.m. ET, Msrs. Burt and Bacchus conferred, out of the hearing of others and off the Record, during which the following occurred:)

DR. LEKOV: Analysis will model the uncertainty and variable input using the Monte Carlo approach and probability distribution, and implemented in an MS Excel format combined to the Crystal Ball software.

That's -- This slide shows the entire

flow of DOE's LCC analysis. So, the bottom -- The top part is explaining the parameters that are needed to determine the total install costs, and the bottom part is related to the operations costs.

13:44:26 I'll very quickly say that yellow boxes are inputs. The green boxes are intermediate calculations, and the final rounds that are reported in blue.

Some of the parameters I'll be

13:44:44 discussing in the next slides. Starting with energy prices, as you see here, energy prices in combination with energy consumptions, which has been explained, are used to determine the annual energy costs.

13:45:08 So, DOE will use the monthly energies price from the most recent EIA data for each of the census division to establish appropriate energy prices for each sampled household.

The -- In addition to this, DOE will use

13:45:26 projections of national average residential energy prices to forecast the future energy prices. And usually it comes with the most current version of the EIA's annual energy outlooks.

And, again, it does not differ from what you know from previous meetings related to furnaces and central AC. Another important component of the life-cycle costs are the determination of the discount rate.

The discount rates are used to determine the present value of the lifetime operating expenses. The way DOE determines the discount rate is from the estimates of the fi-, finance cost to purchase the products.

The main tool to do this is the Federal Reserve Board's Survey of Consumer Finances. That's a tri-annual survey.

DOE uses multiple versions, starting from 1989, up to the most current one. I also say this each workshop.

The costs were taken from over 200 data points. Very solid.

Used by many organizations. And it's, actually allows to determine the financial cost of any debt incurred.

Also has the opportunity, cost of any equity used. And with that, DOE arrives with the

real interest rates that are used in this calculation.

MR. BROOKMAN: Yes, Jim.

MR. VerSHAW: Jim VerShaw.

13:47:36 I guess I'm having a bit of a problem with the Monte Carlo approach on, on the life-cycle costs and payback. Usually when you do a Monte Carlo approach you're determining the effect of variability in a, in a dimensional fit on, for, on

13:47:51 performance on something.

But, you're starting with, with something you've guessed at, and through, through analysis. And so I'm sure -- I'm trying to figure out how, how you know the Monte Carlo approach is

13:48:03 verifying that you had the right numbers up front.

It seems like it's, it may not be worth the effort on this, but, because it, it doesn't really tell you whether or not you had your initial, your initial estimates were in the right

13:48:16 range. It just tells you how much variability in your, in your initial estimates does to what your final answer is.

DR. LEKOV: Let me try to summarize,

essentially starting with basic sort of route. DOE uses RECS, Residential Energy Consumption Survey, which, --

MR. VerSHAW: Which, which, which --

13:48:41 DR. LEKOV: -- which provides household characteristics and some characteristic of the HVAC systems for representative number of households; let's say roughly 3,000.

That three percent of million U.S.

13:49:01 household with this type of equipment.

MR. VerSHAW: Isn't, isn't RECS fundamentally basically through States?

DR. LEKOV: Not true.

MR. VerSHAW: Umm.

13:49:08 DR. LEKOV: It's a statistical example. So, starting from there, and as well as on other multiple sources that usually explain how it is this, there are all the parameters in the calculation, or most of the parameters are

13:49:35 presented by probability distributions with, each of them with specific references.

And from there, basically you derive different cuts of the population impacts. So, the

answer to your question is the math that has been applied to multiple products over the years.

It went through multiple reviews, including high-level government reviews and third parties. So, --

13:50:17

MR. VerSHAW: Okay.

DR. LEKOV: -- that's for now.

MR. VerSHAW: Okay.

MR. BROOKMAN: Okay.

13:50:26

MR. VerSHAW: The, the other problem I have is on discount rates. And I don't see -- You say you're going to calculate one, and usually they come out low based upon the amount of credit the people had, and if they needed to buy a new

13:50:43

furnace, if they had to put it on a credit card.

So, I think you need to look at that.

DR. LEKOV: So, there are two points to bring. First, it's based on a real representative example.

13:50:54

For example, the rates are coming higher than they were the last six years. Also, the second point to bring is those, the numbers you see not for this, not developed for this product yet,

but usually -- Not usually.

They are real, so they don't account for the inflation, so basically are much higher than the numbers you, you see.

13:51:23 MR. VerSHAW: Umm.

DR. LEKOV: Very -- Another big part of the LCC analysis are the installation, maintenance, and repair. In the case of furnace fans, the DOE does not plan to estimate installation costs

13:51:42 because they considered are part of the manufacturer cost of a furnace.

And in terms of maintenance and repair, DOE will evaluate how maintenance and repair costs change with increased efficiency for furnace fans.

13:52:02 They are -- DOE plans to look at how it's made; manufacturer literature, specialty consultants.

As for products, DOE will account for regional differences in labor costs. And one component that DOE plans to look at is to include

13:52:20 the installation of a replacement furnace fan --

(Whereupon, at 1:52 p.m. ET, Msrs. Burt and Bacchus conferred, out of the hearing of others and off the Record, during which the following

occurred:)

DR. LEKOV: -- and the appropriate methods and data sources for assessing changes in installation costs and repair for more efficient furnaces.

MR. BROOKMAN: Bryan.

(Whereupon, at 1:52 p.m. ET, Dr. Amrane and Mr. Stanonik conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. ROCKY: First, I think there is no cost differences for furnace fan efficiencies. It's a blower, a motor, and a wheel.

All you ever do with it is basically clean the wheel as a maintenance aspect in the field. We don't oil motors, for the most part, anymore.

We don't do anything with it on. So, maintenance costs are zero.

MR. BROOKMAN: And no differences, difference between different types of motors?

MR. ROCKY: Doesn't matter. The motor type, the blower type, the manufacturer type --

It's not a factor anymore.

Now, the repair costs, again, is a huge different question, and I'll take it back to the previous testimony, in warranty versus out of warranty. And take the higher costs of a higher efficiency ECM motor can go from double to triple to four times the cost of the replacement of a PSC motor.

It's the design of the whole assembly. It's the programming of the motor.

It's all these other things that we've talked about that impact the cost of a replacement fan assembly out of warranty. That's what the market bears.

It's not what the cost is. It's what the contractor chooses to charge that homeowner.

We have nothing to do with that.

MR. BROOKMAN: Okay.

DR. LEKOV: A question?

MR. ROCKY: Yes, sir.

DR. LEKOV: If there is a case when this, the consumer will decide, "Okay, replacing this motor looks very expensive. Shall I replace

the furnace outright?"

MR. ROCKY: Yes, that actually can happen with today's product. But, that has -- That is now tied in generally with a replacement on an efficiency basis for the furnace, or a system replacement basis for a higher SEER, higher HSPF unit.

It's, it's not going to be the same situation as saying, "I have to spend $600 for a few fan assembly. Should I spend 1,200 or 2,000 for a new furnace?"

Homeowner, if he's going to get into that situation, they're most likely to go to the least-cost option. And they'll pay 650 for the replacement fan assembly rather 2- or $3,000 for a new furnace.

MR. BROOKMAN: Okay. Okay, any other comments on, on this slide?

(Whereupon, no response was had.)

MR. BROOKMAN: Okay.

DR. LEKOV: The next component you put to LCC and the furnace lifetimes, DOE plans to use information from various literature sources and

industry experts, and input from manufacturers and other interested parties to determine a range for a lifetime for these fans.

Comments?

13:55:40 MR. BROOKMAN: Lifetimes.

DR. JAKOBS: Numbers?

MR. ROCKY: This is Bryan Rocky.

In general, a furnace fan is going to last the life of a furnace. So, using the same

13:55:55 standard number as used in other rulemakings for lifetime of furnaces or any of those others would seem appropriate.

However, I would add there's one caveat to that. If you are in an area that the power grid

13:56:09 has severe fluctuations or is susceptible to lightning strikes, it is known statement in our industry that ECM motors, because of the complexity of the controls, have a lesser expected life due to variations in the power grid and lightning strikes

13:56:27 and other things, because of the things that are there.

MR. BROOKMAN: Jim.

MR. VerSHAW: Yeah. I think the

approach is appropriate.

MR. BROOKMAN: Okay. Diane?

DR. JAKOBS: The only other thing I could think of that the same restrictive ductwork is bad for the life of the motors. So, generally it's bearing life.

And so if it's oversized and it's starting and stopping a lot, that's bad for the bearings. If it's over-temperature it's bad for the bearings and that will shorten the motor life.

MR. BROOKMAN: Okay. Okay.

DR. LEKOV: DOE will also develop an energy efficiency base case so the, the developing of the projected market share of products for market efficiency under the base case will be determined in this analysis, and DOE will use data on the recent market trends in residential furnaces and air-conditioner and impacts of the Energy Star program and other policies that may impact demand for more efficient furnace fans.

As some -- Well, just to enhance the slide here, this morning was a pretty extensive discussion of the increased penetration of ECM

design models over the last five, of the last two years. Very different from what DOE did in 2007.

MR. BROOKMAN: So, comments on appropriate distribution rates for residential furnace fans in the absence of amended energy conservation standards?

Yes, Greg.

MR. WAGNER: Well, I was just going to say again, if you don't have a, a way to establish what the base case is, I'm, I'm still -- We're trying to establish what the test parameters are. How do you do the distribution without understanding the base case?

MR. BROOKMAN: Diane.

DR. JAKOBS: I found another -- There is a place in Wisconsin, they were keeping track of ECM furnaces --

(Whereupon, at 1:58 p.m. ET, Mr. Burt left the room, after which the following occurred:)

DR. JAKOBS: -- and they, they said it was 28 percent market share.

MR. BROOKMAN: Oh, okay. Good.

So do you have that data?

DR. JAKOBS: (Nodded no.)

MR. BROOKMAN: Okay.

Okay, other comments?

Charlie.

13:58:58 MR. STEPHENS: Charlie Stephens.

I'll just add that it's going to be pretty variable, depending on where you go in the country. Three years ago, or four years ago, in Oregon, it was 83 percent variable-speed, 90s in 13:59:13 replacement, and 14 percent new construction.

And now it, it's about 80-some percent in new construction as well. So, you're going to find a huge range, I think, when you go out and look.

13:59:26 And, and, and, and I believe it would be a big help to the manufacturers to be, ultimately to put some kind of cross-section of what's happening. If the shippers are only shipping 40 percent, the data you add up is going to be 60.

13:59:43 So, at the very least I'd hope that the manufacturers help with the cross-check to make sure that what is arrived at sounds appropriate.

DR. LEKOV: Just to let you know that

DOE provides the opportunity to do this by census. So, in case DOE retains information that indicates the regional differences for the energy distribution, those will be definitely considered.

14:00:12 MR. BROOKMAN: Okay.

DR. LEKOV: From impacts on the consumers, they're going to switch to the national impacts, starting with the shipment analysis that will, I'll say, change components of the initial

14:00:31 impact analysis.

So, DOE plans to estimate the furnace fan shipment in the base case and the all-standard cases. The method will apply accounting methodology to determine several market segments.

14:00:50 At this time DOE thinks about a replacement in kind. It means replacement with the same equipment type; new housing installations; conversions from noncentral heating to central heating; and then retrofitting into existing

14:01:09 furnaces and cooling products if the fan fails.

DOE intend to evaluate whether standards that require more efficient furnace fans would have an impact on the number of fans shipped. DOE can

also see the application of this parameters that relate to changes in shipment quantities to changes in the install costs for products.

MR. VerSHAW: Question.

14:01:36 MR. BROOKMAN: Jim.

MR. VerSHAW: Jim VerShaw.

When you say "fan retrofits into existing furnaces," are you talking about just a straight in-kind change-out, or are you talking 14:01:45 about changing it from one fan type to another, or one fan efficiency to another one?

Because fundamentally I don't think any furnace manufacturer would want a different motor or different fan put in their furnace because of 14:02:00 all the safeties that are involved.

DR. LEKOV: The issue here is over the analysis period may be needed to replace the furnace before the, the entire period. All the parameters are calculated at distrib-, as probably 14:02:20 distributions.

So, you have the lifetime of the entire furnace product. You have a lifetime distribution of the furnace fan.

So, the, this one, the replacement in kind, it's essentially --

MR. VerSHAW: No, I was talking to the fourth one down.

14:02:39 DR. LEKOV: That relates, the fourth one is directly the replacement situation in case of failure, like I was explaining, the replacement slide.

That case, whatever is available, either 14:02:50 the same kind, PSC with PSC, or if the analysis determined that the existing product that's allow the switch, the switch will be considered.

MR. VerSHAW: There won't be many of those.

14:03:10 MR. BROOKMAN: Greg.

MR. WAGNER: Yeah. I was going to say I think that the concept of somebody building a fire in your basement is what your furnace is, and there's a lot of strict controls over those 14:03:22 products, including the safety features Jim was just talking about.

So, there's not going to be a lot of difference of rated changes occurring within

retrofits, for safety reasons.

DR. LEKOV: Do I understand it to the answer is that DOE will investigate whether products, kits exist for replacements, let's say, from PSD to ESM? If not, we feel --

MR. BROOKMAN: Talbot Gee.

MR. GEE: Talbot Gee.

First of all, I apologize I have to leave so I won't get to hear the scintillating head to these arguments. But, I think this is the way I look, I try to look at any of these rulemakings to figure out how any of my members would implement, market, or install, or lead to the installations of whatever the outcomes.

I have to admit, I'm failing to understand the value of this exercise. I understand you're under Statute to do so, but you know our members who are responsible for training and educating most of their contractors really focus on the whole program's reliance on AHRI Directory.

And that would be what would determine what replacements you would do in these failure

situations. And if you can't make the match, it's probably because the system's so old it really should be replaced in its entirety anyway.

So, it seems to me, just in my limited technical knowledge, which is very limited, but let me just say it seems to me that the AHRI rating method for the matched systems kind of already accomplishes what I think we're trying to do here if you're trying to properly match system installations.

So, that's my global perspective on this. But, we welcome the opportunity to participate and thank you.

So, ask.

(Whereupon, at 2:05 p.m. ET, Mr. Gee left the room, after which the following occurred:)

MR. BROOKMAN: Okay.

DR. LEKOV: So, here are some more details about how the shipments forecast will be evaluated for. In case of replacement, DOE will develop retirement functions from the lifetime estimates and apply them to the existing products.

The existing stock of products that,

will be developed from historical shipments data. In the case of new constructions, DOE will estimate or forecast new-housing construction and saturation rates of various furnace and cooling products types in new housing.

14:05:57

In projecting the future housing situation rate, DOE will consider expected trends in builder and consumer preferences, including competition among space heating and cooling products. So, talking about equipment switching.

14:06:14

In the case of first-time owners, DOE planned to derive a historical rate of product adoption for the noncentrally heated market. Plans to project future adoption rates by considering historical trends as well as market situation indicates that retrofits will estimate the shipment from the lifetime distribution.

14:06:32

And there are a few sources listed at the bottom.

With that, DOE seeks input on the historical shipments data for furnace fans, including the distribution of shipments by efficiency.

14:06:59

DOE will welcome comments on the methodology described to forecast shipments of furnace fans.

And DOE welcomes comments on whether energy conservation standards might affect shipments of furnace fans.

DR. JAKOBS: I, I, I have a question.

MR. BROOKMAN: Diana. Diane. Pardon me.

DR. JAKOBS: That's all right. The -- Are you talking about furnaces? I mean, or --

DR. LEKOV: Furnace fans.

DR. JAKOBS: Well, we don't really -- I mean, we only ship furnace fans as a replacement, so do you really want all this information just about replacement for failed furnace fans, or are you really talking about furnaces?

DR. LEKOV: You, you could structure your comment even to the impact of whether improved or proposed or considered improved efficiency of the fans will impact the shipments of furnaces, the furnace products. Let me use the term.

MR. BROOKMAN: Yeah. Okay.

Karim?

DR. AMRANE: Karim Amrane, AHRI. Again, I don't think we want to recapture furnace fans shipments, per se. But, of course, we have 14:08:28 shipment data for furnaces, so that's something that is what I recalled with the Department.

But, as far as the replacement market, I, I don't know where we could get the data.

MR. BROOKMAN: The, the, the replacement 14:08:41 fans, they still come from the manufacturers of furnaces largely?

DR. AMRANE: Maybe. Maybe they do, but, but as, at least as an industry, as AHRI, we don't capture that data.

14:08:55 So, so we won't be able to share anything with, with you, because we don't, we don't have it.

MS. ARMSTRONG: Yeah.

MR. BROOKMAN: Ashley.

14:09:04 MS. ARMSTRONG: Yeah. I guess if you don't have that type data as far as the actual shipments, and just the, maybe furnace fan assembly that goes into replacement applications only, if

you know the, if you have some estimate, or a good idea based on your American experiences, maybe the percentage of the market that might fix upon fail, rather than replace the whole system as a whole, that would also get to a similar effect.

Does that make sense?

MR. WAGNER: I know. But, that's changing --

MS. ARMSTRONG: It's a cost thing, but --

MR. BROOKMAN: Bryan's earlier comment suggested the price is problematic.

MS. ARMSTRONG: I understand. I understand.

MR. WAGNER: I was going to say -- This is Greg Wagner.

One thing that's happened with SEER implementation is more people are repairing than replacing because of the higher cost of new installation. So, I don't know.

MS. ARMSTRONG: Sure.

MR. WAGNER: I don't know. That's a dynamic thing.

That's been changing dramatically over the last few years with changes in legislation. I don't know that there's going to be a single source that will provide you with clarity on that data.

14:10:11 But, back to the replacement part of it, they do put a lot of safety controls in these devices to keep them from causing problems for the homeowner, and so they are designed for the application. And it is highly recommended that the

14:10:24 exact replacement part is the same as the one that was in there, for safety reasons.

(Whereupon, Msrs. Burt and Bacchus conferred, out of the hearing of others, during which the following occurred:)

14:10:32 MR. BROOKMAN: Frank, did you --

MR. STANONIK: Frank Stanonik.

I was just going to pick up on that point. Again, in terms of at least what I know, past analysis, analyses, the, this particular

14:10:45 question of what might be the mix of shipments of the replacement furnace fans, I really question if it, it's going to be any value because in terms of where it is being a replacement, it, it should be a

like for like.

So, it's not, it's not like a homeowner is going to pull out a 70-percent AFUE furnace and put in a 95- or 90- or whatever. And that, that becomes a relevant piece of analysis.

In this little segment of trying to say, "Well, what happened, what happens in terms of the number of fans, furnace fans that get shipped as repair parts?" I don't know that it matters.

MR. BROOKMAN: Is it possible to just generally estimate?

MS. ARMSTRONG: Wait.

MR. BROOKMAN: Go ahead, Ashley. Go ahead.

MS. ARMSTRONG: And Alex may be better able to articulate this than I, but I guess I ask you: Is it a fair assumption that the Department looks at, once we have a test procedure, that the Department looks at various efficiency levels, and after effective date of the Standard, you know, if we went to, something that was higher efficiency than what the consumer already had, would that make them replace the system as a whole because they

couldn't find a replacement that was exactly like what they had previously?

Is that a fair assumption?

MR. WAGNER: They might not be able to supply it because them controls, they're building a fire in, in your basement.

MS. ARMSTRONG: So, in which case they'll replace the system as a whole.

MR. BROOKMAN: Yes. Great.

DR. AMRANE: If that's true, then this has to be accounted for in the analysis.

MS. ARMSTRONG: Okay.

MR. BROOKMAN: Okay, thank you.

That was Greg, followed by Karim.

Mohammed?

MR. KHAN: Mohammed KHAN, DOE.

I appreciate the many comments we've heard already about the importance of trying to maintain matching to ensure that whatever safety systems are in place are going to be working as they are intended. Maybe you can just elaborate on that just a little bit so I have a better understanding.

My understanding is that when we talk about furnaces, you generally have some limit temperature switches that basically control when and, when, when the burner should turn off and when, when it's okay for it to turn on.

If the temperature limit switch exceeds X amount, burner goes on, blower stays on until the temperature's reduced. Is there anything else that, that we should know about in terms of safety control?

MR. BROOKMAN: I'm seeing two different reactions there, one, "No," and one, "Yes," from the manufacturer.

MR. WAGNER: I'm not, I'm not --

MR. BROOKMAN: Greg.

MR. WAGNER: I'm saying yes, they do have limit switches. And Jim is certainly more versed in what those limit switches do than I am, but in essence they make sure that it doesn't get into an overheat condition.

So, they do cut off when it gets over temperature.

MR. VerSHAW: That's all, all limit

switches do today is make sure it doesn't overheat. The blowers are all, all electronically controlled and after the flame has been sensed, there's a delay time for the blower determined by the
14:14:05 manufacturer.

The blower comes on, and when the heat has ended, then the blower goes off. And if there's some kind of fault in there, for instance, if it gets too hot, it turns off, the blowers keeps
14:14:17 them running until that recloses.

There's also rollout switches and pressure switches and all kinds of things in there that have different reactions. But, in normal operation it's, it's, it senses that the flame is
14:14:29 running and then it delayed, there's a delayed start.

And then when the flame goes out, it goes off by itself. If the flame doesn't go off for some reason the, the gate states open, then the
14:14:44 system keeps the blower running.

MR. BROOKMAN: I'd like to address Item 44. I think Ashley was addressing this, at least in part.

What do you anticipate is going to happen with shipment should Energy Conservation Standards be put in place for furnace fans?

(Whereupon, at 2:15 p.m., Mr. Wagner and Mr. VerShaw conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. BROOKMAN: Do you see it there, Item 44?

Yes, Jim.

MR. VerSHAW: This is Jim VerShaw again.

I think if you look back over the years of what happened as higher efficiency Standards were put in place, I think we're seeing increase in, in repairs and a decrease in furnace or, or in HVAC sales. I think SEER is a good indication of looking at what shipments have been since 13 SEER went in.

And you look at the parts revenue of the various companies, that they've gone up. That I think's a similar risk here.

If somebody's got an older furnace but yet now the price has got even that much higher,

that the push for them to repair that and not actually get a higher efficiency furnace could be higher. And so we want, we want to make sure that we don't get to a point where we ought to replace the equipment when it ought to get replaced, and just keep repairing because the cost of new gets too high.

MR. BROOKMAN: Diane?

DR. JAKOBS: I was thinking that if Energy Efficiency Standards on the AC side are already moving furnaces in the direction of more efficient fans because it's part of the calculation for zero, and that's, that's where the advantage is, so we're, we're already seeing this shift with the rebates and, and, you know, going -- Some, some of our equipment, we have a version in the PSE blower to get 13 SEER.

We have the X-13 that brings you up to 14 SEER. You know.

So, so it's already being pushed in that direction. I don't know, I don't know if this would make any difference.

It, it's already kind of moving that

way.

MR. BROOKMAN: Umm.

Bryan, I thought you were going to comment. Any thoughts on how Standards might, might affect shipments?

MR. ROCKY: Yeah. Again, Bryan Rocky.

I, I'm agreeing with what Diane just said. The driver from a system standpoint AC and heat pump higher SEER, higher HSPN ratings is a significant ten-times multiplier versus the impact of just efficiency of a furnace fan.

The reason we're selling more ECM motors and air handlers and furnaces is to meet the '15, '16, '18 zero weatherization programs, tax credits, all the things that the consumers can get money back that offsets the cost of that product.

And there is -- Unless there is some incentive for just a furnace fan, there's, this, this part of it is going to be very insignificant to the whole overall market impact.

MR. BROOKMAN: Okay, thank you.

DR. LEKOV: With that, going to a national impact analysis. The purpose is to assess

aggregate impacts at the national level potential energy conservation standards for each of the product classes, and those are presented as net present value of total consumer, consumer economic impacts and the national savings.

DOE calculates the annual equipment expenditures by multiplying the price per the unit by the forecasted shipments. Have been explained.

The difference between base and standard case gives the national energy bills savings and increased expenditures. The difference each year between energy bill savings and increased equipment expenditures is the net savings or net cost, and this is illustrated in a better way here.

So, there's -- This chart is for the national energy savings, and there is a similar one for the net present value. So, DOE determines the shipments from the base case, the base case annual energy consumption for the entire analysis period.

Does the same thing for each of the standard cases, develops cumulative values, comes, uses the site to source factor, and arrives at the national energy savings. And this is what you're

seeing on the summary page of the DOE's spreadsheet.

Similar fashion, the calculation of the nets, net present value, essentially the dollar value of those savings. It's determined for the base case basically to operating costs, which includes the energy cost of operating, savings, and the maintenance installation cost is included in this in both base case and standard case.

Separately the product cost is determined. The base case and the standards case, develop the total operating cost.

The total cost increase, a discount cost is arrived at; arrived at the net present value of the savings. So, this is just outline of the methodology as used in every single rulemaking the last years.

Next point relates to the standard case efficiency distribution. DOE usually uses either roll-up or shift scenarios for estimating the impact of Standards and product efficiency distribution.

Roll-up scenario essentially, here are

the basic. Assumes that the product efficiency in the base case do not meet the standard level under consideration would roll up to meet the new Standards level, and the levels above the standard level are not going to be affected.

In the shift scenario, DOE retains the pattern of the base case efficiency distribution but reorient the distribution at and above the new minimum Energy Conservation Standard, which means that essentially everything below the Standard is distributed at the Standard and above.

And for this rule for the next case DOE will evaluate whether one of these approaches is more reasonable for furnace fan, or whether it, it would be preferable to use both scenario as a combination of those in the calculation of the national impacts.

And DOE seeks comment on the appropriate assumptions to use regarding long-run changes in furnace fan energy efficiency independent of the standards, and DOE seeks comment on, on the use of roll-up and shift scenarios.

MR. BROOKMAN: What about roll-up and

shift?

Yeah, Diane.

Or, Frank first.

DR. JAKOBS: Frank first.

14:22:39 MR. BROOKMAN: Yeah.

MR. STANONIK: Well, this is -- It's a bit of a strange circumstance, I mean, because in, in, in terms of what we know today as far as furnace fans, you either have the traditional motor

14:22:56 or you have the, the brushless magnet. I mean, that's it.

I mean, those are the two things that are the biggest factors in how much electric energy your furnace fan uses. And so I'm -- Unless this

14:23:14 analysis or, or technology evolves and DOE finds some other variations, if, if you're stuck with basically the, the, the, let's call them the two options, then the only thing that makes sense is roll-up.

14:23:29 There is no shift. You know, if, if we stay -- If this is kind of where we end up or where things stay, then if there's a subsequent Regulation, then it's only going to be a roll-up.

I mean, there isn't anything else. So, I mean, you know, this is certainly the framework DOE has used for a lot of analyses, but at least in, in my experience this is the first time we're trying to analyze the component and not the finished product.

It's a little weird.

DR. JAKOBS: I just --

MR. BROOKMAN: Diane?

DR. JAKOBS: Sorry. The -- A couple weeks ago one of the, the guys from the lab, he came up and, and the gas utilities in our area, they had a little brochure and they talked about how electrical energy is really only 30-percent efficient when you consider -- I mean, they were talking about source efficiency versus site, you know.

And if there was an awareness of that, I think that it would become more important. People seem to be more aware of energy efficiency, and if they understood it maybe a little better -- But I agree with, with Frank that it, it, it's a matter of just rolling up.

It's a funny thing of, you know, you can have a hundred-percent AUFE resistance for it, you know.

MR. BROOKMAN: Okay. Other comments on these two issue boxes?

DR. LEKOV: DOE also usually looks at life-cycle costs of group impacts, and here is the core of such analysis, to analyze the economic impacts of Standards on consumers, including some subgroups who may be disproportionally impacted compared with the general population, such as low-income or senior citizens usually.

(Whereupon, at 2:25 p.m. ET, Msrs. Burt and Bacchus left the room, after which the following occurred:)

DR. LEKOV: And the method is, basically extends analysis in order to specifically examine those defined subgroups, and uses input specific to each of the considered consumer subgroups. So, any comments on which, if any consumer subgroup, subgroup should be considered for when developing Standards for furnace fan?

MR. BROOKMAN: And you can see a couple

of them that are noted, low-income consumer, senior citizens as possible examples.

Terry.

MR. SMALL: I hate to, to push the manufactured housing thing too much, but, you know, the, the, the stratum of people that are, that are in the low-income, low-cost housing such as manufactured housing have some special challenges and they want efficient systems. They want inexpensive operating costs.

They need it probably really more than most. But sometimes the up-front cost of putting in advanced systems, advanced motors, ECM motors and all that, particularly tough on people, say, that would live in, in a manufactured home.

And I don't know whether in the procedure you do in your economic analysis maybe you could consider that group as a subgroup in terms of looking at the economics of, you know, the, the, the rulemaking you're proceeding with.

MR. BROOKMAN: Okay.

DR. LEKOV: Okay. So, you correct me if you want.

So, we are -- You are recommending for the manufactured home to create a separate product, --

MR. SMALL: Well, I think --

14:27:43 DR. LEKOV: -- separate evaluation of the population types?

MR. SMALL: I think if you'll look at the housing types, normally manufactured housing is your least expensive per square foot housing in the

14:27:56 U.S., and so it tends to cater to people that, you know, that, that can least afford housing. And so in, in a manufactured home is a heater, a furnace, maybe an air-conditioner.

So, a lot of times I think that the cost

14:28:16 of these things relative to somebody at that level of housing is, is overlooked.

MR. BROOKMAN: Thank you.

Diane.

DR. LEKOV: Probably one sentence. RECS

14:28:29 actually provides the means of household income, and also provides information whether the home is a manufactured home.

So, this is --

MR. SMALL: This is the RECS, the RECS data?

DR. LEKOV: Two-thousand-five. So, this will allow to extract this information.

14:28:49 MR. SMALL: You know, and I've talked about this product class. I think it's very important here that just one size does not fit all.

You have some different product classes that some of these product classes are aimed at a

14:29:01 different economic group, and the, the installation costs are different. The distribution is different.

Everything is different. Everything is aimed at value and, and, you know, inexpensive

14:29:16 where possible.

And, you know, if the economics of that aren't paid attention to, then this subgroup would be effected.

(Whereupon, at 2:29 p.m. ET, Ms.

14:29:23 Armstrong and Mr. Stas conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. BROOKMAN: Bryan.

MR. ROCKY: Yeah, Bryan Rocky.

I would just add to that, to what Terry said, because I'm really cautious going back to the RECS data from 2005 or earlier, based on the
14:29:39 tremendous change in the housing market the last few years with the, the bubbles, everything else that have collapsed.

But, manufactured housing in particular is a vastly different market today than it was even
14:29:53 in 2005, as far as new-home construction versus replacement. Go back and look at the numbers that were available from, like, Manufactured Housing Institute.

Currently, 2010, there will only be
14:30:09 something like 42- or 45,000 new homes built in North America, versus even five years ago it might have been 120,000 homes. And it definitely drives the economic point, as Terry was making, that in that market segment they are not buying new
14:30:27 products.

They are replace -- Not replacing. They are repairing.

And they are not replacing with higher

efficient product unless they absolutely have to.

MR. BROOKMAN: And did the manufactured housing sector, does it pick up that difference, or is that, do you not know?

14:30:42 MR. ROCKY: I'm sorry. As pick up the difference, Doug, in what?

MR. BROOKMAN: The decline in housing starts.

MR. ROCKY: The decline in housing

14:30:50 starts is, is -- They're not selling the product.

MR. BROOKMAN: Okay.

MR. ROCKY: People -- Home -- Homeowners are not replacing mobile homes or manufactured homes. They're repairing older products.

14:31:00 MR. BROOKMAN: I got you.

MR. ROCKY: And they're repairing older equipment in those products.

MR. BROOKMAN: Okay, thank you.

MR. ROCKY: Even with tax credits and

14:31:08 everything else that are available.

MR. BROOKMAN: I've got you.

Go ahead, Terry.

MR. SMALL: Go ahead, Frank.

MR. STANONIK: No, no. I'll fish it out.

MR. SMALL: Well, what I was going to say, unfortunately I didn't come up to the furnace NOPR, I guess a month or two ago, but I notice just in looking back in the history of the, what is it, the, the TSLs, I guess that a good example is there's a proposal to maybe carry in the northern region of the United States the minimum furnace efficiency to 90 percent of condensing furnace.

And I'm assuming that if that is to be the final rulemaking, that would mean that you could be living in a $10,000 mobile home that had a, you know, a 20-year-old mobile home that had a, a 20-year-old 75-percent AUFE furnace, and you'd be forced to putting, installing a condensing furnace which could end up costing you, you know, a-third of the cost of the home, or the value of the home; you know, two-, $3,000, because you're going to have to change the venting.

You've got to do something with the condensate, which may have some little acidicy in it. And these people are, at this level, I think

it just isn't going to happen.

So, what are they going to do as an alternative? Probably go out to WalMart and buy some floor furnaces or, or portable furnaces or, you know.

In other words, the country is going to save nothing in terms of, of, of energy, and it may even create some safety situations. So, I -- The point I'm making is I think that something like manufactured housing is its own product class and, you know, somebody needs to carefully look at the true installation cost, as Bryan said, of going back.

People are not going to buy a new mobile home if they have to buy a new furnace. I'm not sure it's justified to make them buy the most advanced technology to include this fan furnace and, and ECM motor, et cetera.

MR. BROOKMAN: Eric Stas.

Thank you.

MR. STAS: Eric Stas, DOE.

Just try to clear up a little here. While it's appropriate under EPCA to analyze the

different consumer subgroup impacts when we are setting product classes, it's not based on, on economics. It's based on the criteria in 6295 such as that the product consumes a different type of energy not consumed by other covered products within the type or class, or has the capacity or performance-related feature to distinguish the product classes.

14:33:50

This, this type of thing with who the consumer is, and their, their economic situation is maybe considered in how to set the overall levels, but not product classes based on that use basis.

14:34:03

MR. BROOKMAN: Charlie.

MR. STEPHENS: Charlie Stephens again.

I've got about 20 years of history working with a mobile home/manufactured home manufacturers out where we are, four states plus California markets, but nobody buys furnaces better, cheaper. Has anybody ever seen the Invoice on a, on a furnace for a manufactured home?

14:34:19

14:34:36

(Whereupon, no response was had.)

MR. STEPHENS: I have. You'd be shocked at how cheap they are.

Most of them come with electric forced-air furnaces. Most of them do not have fossil furnaces because most of them are rural and all they have is electricity or, or propane.

14:34:53 Some of them do have propane furnaces, that's true, but most of them do come with electric forced-air furnaces. That's absolutely the cheapest thing you can put in to heat it.

You can put a heat pump to some of them.

14:35:09 However, they are more like -- They actually meet or exceed building codes.

They're two-by-sixes, 21R, 35R home. You know, these are good homes.

They're still making quite a few of

14:35:21 them. They're not trailers.

They're a double-wide 1,300-square-foot building that is quite energy efficient to start with. HUD regulates those, and they're already a separate class.

14:35:32 The furnaces in there, the mobile-home furnaces are already a separate class and a separately selected product under NAICA. So, they probably would bear looking at as a separate class

here as well.

But, I -- Again, I think what we regard where we are, low-income and seniors who are, who live in manufactured homes are a subset of low-income and seniors. So, they are large -- They are significantly occupied by low-income and senior people.

But, there are other people in those categories up there that don't live in manufactured homes, but I think those are appropriate categories of consumer subgroups. Some of them live in manufactured homes, and those may be considered a separate class.

They are already a separate class for regulation. So, I don't know how this rulemaking will look at them, but if it's similar to the furnace rulemaking, then they will be a separate class.

MR. BROOKMAN: I see. Okay, thank you.

Additional comments?

(Whereupon, no response was had.)

MR. BROOKMAN: Okay.

DR. LEKOV: To Rob Carmichael.

MANUFACTURER IMPACT ANALYSIS:

MR. CARMICHAEL: Good afternoon. My name's Rob Carmichael.

I'm with Navigant Consulting, and I'm going to take us over the, the manufacturing impact analysis and the methodology for that.

Just real briefly, the, the purpose of the manufacturer impact analysis, or the MIA, is to really cover three broad, broad topics.

(Whereupon, at 2:37 p.m., Mr. Wagner and Dr. Jakobs conferred, out of the hearing of others and off the Record, during which the following occurred:)

MR. CARMICHAEL: The purpose is to assess the impacts of new energy standards on manufacturers of, of these products that, that, that we're covering here. We do that both qualitatively and quantitatively.

Second purpose is to identify and estimate the impacts on any subgroups of manufacturers that may be differently or, or more adversely affected than the industry as a whole.

And then lastly -- I'll talk about this

a little bit later, but we're trying to look at the cumulative regulatory burden. So, what other Regulations are manufacturers of this, these products subject to?

14:37:47 And we try to take into account the consequences of those Regulations.

There are two -- Moving to, to methodology, there are two main tools, primary tools that DOE uses in conducting the MIA. The

14:37:59 first is the Government Regulatory Impact Model, or the GRIM.

It's a (sic) industry cash flow model, so what it does basically is project cash flows out through the entire analysis period and discount

14:38:15 those back to the present value, both in the base case and in the standards case, and come up with a, a change or a (sic) impact to the industry.

The second major tool there are the interviews that we, that we conduct with the

14:38:28 manufacturers themselves. We use these to refine those inputs that are going into the cash-flow model, and use those and, to identify and to develop any subgroup analyses.

So, for instance, small-business manufacturers, perhaps. And, and to address other qualitative issues such as the impact on competition in the marketplace, manufacturing capacity, and employment.

14:38:50

And then obviously the key output of the Manufacturing Impact Analysis is the change in industry net present value. And then we'll also come up with the change in, in net present value as it relates to a particular subgroup that we, that we choose to analyze, and then the employment impacts and the impact on capacity that I mentioned for some other more qualitative outputs that come from this analysis.

14:39:09

So, down into, a little deeper into the methodology, the MIA consists of three phases. In the first phase we'll create a (sic) industry profile, and this builds for market and technology assessment, takes what we've learned here today and, and what we've learned and, from your comments, and, and tries to, to build a market characterization of the what the manufacturers are facing in the marketplace.

14:39:21

14:39:36

Then the next, the next stage, when we move on to the Phase 2, is build just a straw man GRIM. So we're going to take, like, the engineering.

14:39:58 We'll take the manufacturing costs that manufacturers are facing, as well as the shipment analysis, take the annual shipments, and throw them into the straw man GRIM to get a general understanding of, of how, of what sort of impacts

14:40:13 the manufacturers will be facing.

And that helps us move on to that next box there, develop the energy guide which we use to guide, obviously, the interview with, with manufacturers which begin in Phase 3. And so

14:40:27 we'll, we'll conduct those interviews and use those to refine the, our initial analysis our straw man GRIM and come up with more precise, more precise inputs than some people may have outputs than from the government model.

14:40:47 And then lastly, after those discussions and further research using mostly publicly available information, so, industry reports, SEC 10Ks, manufacturer Annual Reports, we'll be able to

look at the direct, assess the direct employment impacts as well as impact on competition.

So, as I mentioned before, DOE recognizes that there may be differences or more adverse impacts on small businesses, and as, as part of that, DOE always looks for, looks at this in particular.

The Small Business Administration has set a, a threshold for what constitutes a small business in this industry at about, at 750 employees or fewer. Now, there, there can be other subgroups, and at this time DOE would like to ask for comments on what, any subgroups that DOE should look at, including whether or not to look at small-business manufacturers.

MR. BROOKMAN: Comments to subgroups?

(Whereupon, no response was had.)

MR. CARMICHAEL: Okay, and then on cumulative regulatory burden. Again, this is the other federal regulations, other regulations to which manufacturers of furnace fan products are, are also subject.

And the two clear, clear ones here that

we have listed are the Energy Conservation Standard Rule on furnaces and boilers, and the Energy Conservation Standards for central, CAC and, and heat pumps.

14:42:33 DOE welcomes comment on any others that DOE should consider.

MR. BROOKMAN: Karim.

DR. AMRANE: Karim Amrane, AHRI.

Well, there are several others that DOE

14:42:45 is currently doing, like the standby power rulemaking on both the furnaces and, and central AC, or the test procedure on central AC air conditioners. And, yeah, so those are a few.

But, but, again, you need to look also

14:43:06 at what's going on at EPA; what's going on in legislation. For example, like, they going to be impact on industry not related to furnaces but related to, for example, refrigerant that may impact, that will impact manufacturers of furnaces.

14:43:24 MR. BROOKMAN: Thank you.

Diane?

DR. JAKOBS: Rheem as an individual company. We make water heaters, too, so we're

affected by that.

Also there's emissions requirements in California on furnaces. We were going to be affected on that.

14:43:39 MR. BROOKMAN: Okay. Okay.

Bryan.

MR. ROCKY: Yeah, Bryan Rocky again.

You're talking about several things. Since the manufacturers of most residential

14:43:47 furnaces, central air conditioners, also make commercial products, there is a, a regulatory burden of the addition of all the commercial product Regulations that are coming onto this.

Karim said, you know, EPA. So, Energy

14:44:02 Star changes, has an impact on us.

The proposed Home Star legislation will have an impact on us as builders. There are other efforts in Canada that are continuing to go.

Refrigeration, refrigerants is an

14:44:20 obvious one of these two. The AC and heat pump criteria changes will be the most impactful.

That will be the thing that will drive an indoor site air handler or furnace will be more

than anything else. Low NOx emissions; weatherization programs; utility requirements.

I mean, there's just so much going on. Building Code changes like Title 24 in California that are now spreading to other parts of the country where it's not just the efficiency as we've talked about in a test condition, but as verified performance in the application itself will change, could change how manufacturers design furnaces, air handlers, air conditioners.

So, the, the accumulation of all this makes it a really interesting time to be a manufacturer.

MR. BROOKMAN: Karim.

DR. AMRANE: Karim Amrane, AHRI again.

Well, in the past, DOE has always asked the question. DOE has always looked maybe how deep that you look at the regulatory burden.

But, I'm, I'm, I'm here at DOE almost every week now. So, there are rulemakings all the time.

And that is just at the federal level. They are also, you know, like Bryan mentioned, at

the state level.

So, I think more and more now this is something that DOE needs to look at, needs to seriously look at the impact on manufacturers.

14:45:47 MR. BROOKMAN: Okay, thank you.

Other comments?

(Whereupon, no response was had.)

MR. BROOKMAN: Back to Alex Lekov.

UTILITY IMPACTS, EMPLOYMENT IMPACTS, ENVIRONMENTAL IMPACTS, AND REGULATORY IMPACTS ANALYSES

DR. LEKOV: There are four, four downstream analyses that we'll briefly explain. Each of them is about one slide.

So, starting with the utilities impacts, essentially the purpose is to assess the impacts on energy supply, on the national energy supply. And DOE uses a standard model called NEMS, National Energy Modelling System.

And the way it's done, this is a pretty complex model. It's evaluated in the case of no standards and furnace, in the case of standard furnace standards.

The differential essentially is reported

mostly as avoided capacity, utilities capacity, like in gigawatts. And this is what DOE plans to present.

MR. BROOKMAN: Comments on utilities impact analysis? Anything additional to what Alex has just described?

(Whereupon, no response was had.)

DR. LEKOV: There is another, I would characterize standard type of analysis DOE does which is employment impact. Just to bring here the topic that's focused on indirect employment.

In fact, Rob just mentioned about the direct employment factor which is on the manufacturer. This is overall on the nation.

It -- Essentially it's look of a potential of how the savings, the consumer will have expenditures will be used for other equipment and, and energy costs. And the method to be used is standard methodology used in the different branches of the federal government called ImSET model.

And DOE seeks comment on this approach of assessing potential employment impacts.

MR. BROOKMAN: Bryan.

MR. ROCKY: Yeah.

Alex, I think the, the process and the approach is just fine. Unfortunately, the, the direct impact of all this is we're talking of something that is in the neighborhood of two to four percent of the total energy usage of these appliances, and as far as changing consumer use, or impacts on the, a consumer, this will have almost zero impact, this whole process, this whole study.

We're in a situation where reality is for most homeowners these days they spend more money on cell phone bills than they do on heating and air conditioning in their homes. And if we're talking about a change that might be a two- to three-percent savings in total energy use by an HVAC system, it's insignificant, versus additional cell phone or plasma TVs are, or all these other things impact the house.

Your methodology is fine.

MR. BROOKMAN: Okay.

MR. ROCKY: I think the results are going to be very disappointing.

MR. BROOKMAN: Thank you.

Okay.

DR. LEKOV: Environmental impact: So, DOE would report environmental impacts resulting from standards, including changes in power plant emissions and the way it's going to be done is very similar to what just described for the utilities analysis, basically comparing a base case versus a standard case.

14:49:44 14:50:04 14:50:31 14:50:48

The result is an estimate of national emission reduction of CO2 and NOx and mercury. Important component of it, relatively new for industry partners, is essentially the monetization of these emissions, those that have been presented during the several rulemakings this year.

In summary, for this particular product DOE plans to use the most current social cost of carbon values developed by interagency reviews. This is -- The methodology and the values used by DOE are developed outside of DOE.

So, those values will be used to assign a, a monetary value, the green, potential green card house gas emissions, including but not limited

to different productivity loss, health effects, property damage, and rank changes in the ecosystem. This is what, this social cost of carbon, and, and those are the values that are going to be reported in DOE's documentation for this product.

Basically, DOE also will estimate the potential benefit of reduced NOx emission for the considered standard levels.

The questions are input on its plans to use NEMS-BT again for to conduct environmental assessment, and request comment on the approach it plans to use for estimating the monetary values.

MR. BROOKMAN: Yes, Karim.

DR. AMRANE: Karim Amrane, AHRI.

Are you thinking about energy consumption, are you going to be, or did I miss that, the energy consumption of those? But, anyway, my, my -- First of, of all, as I said before, we don't believe that this rulemaking should apply to, to heat pumps and to, to air conditioners as well, at least those that have cores.

Now, let's say that the, talk about this

split system. And, and, and you estimate the energy consumption of those fans, but again, the, the zero rating on the cooling side will account for, for the energy transfer fan as well.

14:52:38 So, now we are going to account for the CO2 emission that, that, that either the air conditioners will emit or will contribute, and at the same time it will double-, it will double-count the, the CO2 emission that the fan itself is, is

14:52:52 accounting for.

So, I think DOE has to be very careful here, because, as I said, you are mixing something that is already accounted for in a SEER calculation or HSPF contemplation with this, with this new

14:53:06 energy, you know, thing, energy efficiency standard that you're trying to, to develop here.

So, I think you need to account to, to, to, to make sure that you're not double-counting here.

14:53:20 MR. BROOKMAN: Okay.

Any other comments, particularly on the, what they list here as cost of carbon, for example?

(Whereupon, no response was had.)

MR. BROOKMAN: No additional comments on that? Okay.

DR. LEKOV: And DOE also performs regulatory impact analyses, which essentially investigate the national impacts of nonregulatory alternatives compared with mandatory efficiency standards. And usually this is the least of the policies that, nonregulatory alternatives that DOE analyzes.

I'll read them. Consumer rebates, consumer tax credits, manufacturer tax credits, voluntary efficiency targets, earlier replacement, and bulk government procurement.

Usually DOE develops a separate national impact analysis spreadsheet model for these policies, and estimate those based on existing experience with such policies. And output is very similar to the output from the national standard.

You'll see a saving from the policy, and you'll see net present values. In the case of, of furnace fans there are some incentives out there that are driving the market to a large extent, so this is here as appropriate place to assess the

history of those incentives and how they potentially could be considered.

So, welcome comments on what the existing Regulations or pending Regulations should consider in its examination of cumulative -- Oh, this is the correct one.

DR. AMRANE: We were only going to answer it, it once.

DR. LEKOV: Or --

MR. BROOKMAN: They're still paying attention, we've proven.

MR. ROCKY: This is Bryan Rocky.

I cannot overemphasize enough on the tax credits on the product mix that our industry's had for the last two years. And while ECM motors and blower assemblies have been part of both manufacturer rebate levels as well as tax credits and utilities rebates, the vast majority of this is being driven by the zero HSPF and AUFE connection as far as the tax credits for these rebates.

And depending upon -- Without speaking for the rest of the manufacturers, depending on the product category from 2008 to 2010, those

high-efficiency products for us might have grown anywhere from 200 to 500 percent of the volume in two, that we built in those products in 2008.

MR. BROOKMAN: Wow.

14:56:38 MR. ROCKY: That's a tremendous shift for us as a manufacturer. It's been a great value for the customers that have bought our products, and it has changed our business model going forward.

14:56:51 MR. BROOKMAN: Wow.

MR. ROCKY: It is, it is the reality of it. And I think there will be a tremendous lag in our industry from the consumers if we don't continue as a nation to have more stimulus-type

14:57:04 packages and more consumer rebates and tax credits, because our customers are getting used to now having those available.

MR. BROOKMAN: Like the automobile industry, for example.

14:57:14 Karim.

DR. AMRANE: Karim Amrane, AHRI.

Based on just what Bryan said, you don't need the rulemaking at all. Stop it.

Tax incentives should be what we, what the Government should do.

MR. ROCKY: Yeah. I wasn't really actually trying to say that, but in the reality is I would be all for a 95-percent AUFE motor Standard for the -- Because we would make a whole lot more money and sell product that our customers would be happier with in all these variations, and be more comfortable with.

14:57:48 Now, the cost of doing that, most homeowners will not enjoy that part of it. But, if they get tax credits, if they get utilities rebates, they get weatherization project money from their state and local governments, hey, it's free.

14:58:04 I'll buy this stuff. But we're all paying for that somehow.

MR. BROOKMAN: Yeah. Okay. Thank you.

Thank you, Alex.

NEXT STEPS AND CLOSING REMARKS FROM INTERESTED

14:58:12 PARTIES

Lets put up the, the final comment slide. And while he's doing that, now is an opportunity for anybody that wants to to make final

comments surrounding other issues that they wish to raise, or questions.

Molly.

MS. TROMBLEY-McCANN: Molly Trombley-McCann.

I actually have more of a process question, so maybe, Mohammed, this might be to you.

But, in the slides it showed you going directly from the framework to the number stage. I'm wondering if, for the Standards rulemaking at least, there's going to be preliminary technical support documents released, and if you plan on having any hearing time period for those documents.

MR. KHAN: No different from the other analyses that we do in our rulemaking goes. There would -- There will be technical support documents and everything provided.

And, you know, after the NOPR's published we'll also have another public Hearing.

MR. BROOKMAN: Yeah. Let me -- While individuals in the room are formulating their comments, let me hand out this evaluation form.

It takes about 30 seconds. The

Department reads them carefully.

They like to receive feedback on these meetings, so, as I said, now is an opportunity for anybody that wishes to do so to make additional comments, summary comments.

Frank?

MR. STANONIK: Frank Stanonik with AHRI.

This particular rulemaking, I think it is critically important that perspective be constantly maintained on this issue. We're talking about furnace fans.

We're talking a lot, as Bryan mentioned, that from, from the worst to the best, at least as measured by DOE test procedures, that it's only, that consumption is anywhere between four percent to something maybe a little less than two percent.

And, and we've also made some comments that there's a potential to add a significant testing burden if you get carried away with this. And, and so I, I think, again, it, somehow DOE and, and the, and their contractors need to keep this in perspective as far as what they're regulating and what it means to the overall picture of the, the,

let's say the overall consumption of the furnace, or in the case of, as we've said with the, with the heat pumps and air conditioners really shouldn't be applied because it's already been accounted for.

15:00:58 And so I just think that, that that's really critical in this situation.

MR. BROOKMAN: Okay, thank you.

Diane.

DR. JAKOBS: Just to add onto what Frank

15:01:07 just said, we all have airflow data, but it's provided to our customers for their design of the, the complete system. If, if it was going to be data that had to be certified, typically for us, we do one sample.

15:01:26 But, if it was going to be certified to a certain confidence level, we would want two samples, three samples. And that would be a big burden to go back and, and take our existing stack of, you know, our offering, and go back and get

15:01:44 additional airflow data.

MR. BROOKMAN: Okay.

Karim.

DR. AMRANE: Karim Amrane, AMRI again.

This is an excellent point that Diane's bringing. You know, there is this new enforcement of DOE.

DOE is now thinking of, for example, mandating educational programs. If this -- When this will be completed, manufacturers will have to certify their ratings.

And that's going to be additional test burden on manufacturers that DOE eventually will have to, to assess. So, all this, we were talking about rulemaking and rulemakings.

And we are complicated test procedures involved in AC test procedures and everything else. And that has an impact on the manufacturers.

So, I hope that when you do these analyses, that you will account for all this, because it will show the way this industry, the way we are going probably is going to go bankrupt in the next 20 years just on the burden what have the Federal Government is putting on manufacturers to test and to certify and to verify and everything else.

MR. BROOKMAN: Okay, thank you.

Bryan.

MR. ROCKY: Yeah, Bryan Rocky.

Just as a last comment, I guess complexity of certified data gets to be a real interesting discussion that in the case where we haven't had certified data before, and that always brings a question, and I guess I would comment, offer the last comment of appreciating the, the opportunity to be here to, to give comments, and we will be providing written comments as well.

But, the discussion with, with Charles, among other things, the speculation I think from a lot of groups is going to come out that this is not going to be something that's just a laboratory comparison; that this might read, lead to a (sic) efficiency rating value that will directly correlate to something consumers would be able to use and say, "This is how much electricity my HVAC system is going to use."

And that, that is not this direction. I mean, it -- We're talking back to EPA miles-per-gallon in standard situations.

I'm really concerned that where we're

going with this process, where DOE wants to take it is not going to lead us to a realistic test method or procedure that is good for comparing products from one manufacturer, one application to another, but rather leads us towards something that we're not ready for yet, which is an applied energy descriptor that accounts for the vast variations in applications of homeowner styles and usage and maintenance and all these other things we've talked about.

MR. BROOKMAN: Okay, thanks.

Yes, Diane.

DR. JAKOBS: Well, the, the other side of a taking into account all those things is to ignore them, you know, and maybe just having a, a standard rating point and a setup where you're comparing the same thing across products, and, you know, forget about trying to account for everything that happens in the installation.

That, that might be really more effective.

MR. BROOKMAN: Molly.

MR. TROMBLEY-McCANN: Molly

Trombley-McCann.

This is actually another question, but I'm not as familiar with the case where there has not been Standards previous. And so I'm wondering, for something that hasn't had a test procedure previous to this point, -- Our only new products that are introduced to the market required to be tested or are all products that are on the market. -- do manufacturers have to go back and test them manually?

MR. KHAN: Mohammed KHAN, DOE.

It would apply to products that were manufactured after the compliance date.

DR. JAKOBS: Manufactured, not designed; right?

MS. ARMSTRONG: Well, and she's got it right.

MR. KHAN: Manufactured. Yeah

MS. ARMSTRONG: Yeah.

MR. BROOKMAN: Okay. So, then thanks for these, this last round of comments.

From my perspective, I'll turn it back to Mohammed KHAN. I really appreciate the level

and depth of the exchange.

I think the Department got a lot of useful information. Thanks to all of you for that.

Mohammed.

15:05:57 MR. KHAN: Thanks, Doug.

Doug is right. We received a lot of very useful information and comments here today, and I want to thank you for that.

And appreciation is doubled because, 15:06:09 like I said at the onset this morning, this is the first time the Department of Energy has embarked on rulemaking for a, a product that, well, which is basically, I guess, a sub-, sub-, subcomponent of a, of a, of a current product that's covered 15:06:29 already.

So, it's important to, to get your information up front, and thoughts and suggestions on that. We covered a lot.

We talked about -- We've got the 15:06:42 responses to the questions that we raised in our call-out boxes, and I think we also got some information, or touched on some points that were outside of the things that we are looking at.

And, for example, I think one of the ones that came up that I remember right off the bat was how long, or what the duration of the fan motors are actually operating at. And I think someone here earlier mentioned that in the case of the newer homes that are being built, because they're more tightly built, homeowners are using these fans more liberally and making them, or allowing them to run without any cooling or heating function going on as well.

So, in providing us data and information, you know, things that we talked about in the call-out boxes in particular, we're looking to get -- And if there's information that's also relevant that aren't specifically addressed or called out in the, in the presentation, that's also going to be welcome.

And, again, just to make clear, comment period closes July sixth. And these are the ways that, that you can send them to us.

And again, thank you for your time today.

MR. BROOKMAN: Safe travels.

(Whereupon, at 3:08 p.m. ET, the above Hearing was concluded.)

The foregoing ASCII transcript has been edited and was, at the time of delivery, a certifiable Transcript of the proceedings, barring any post-delivery edits.

CERTIFICATION

I, D. I. Bunn, a Registered Professional Reporter, Certified Conference Reporter, and Notary Public, do hereby certify that the foregoing testimony was duly taken and reduced to writing before me at the place and time therein mentioned. I further certify that I am neither related to any of the parties by blood or marriage, nor do I have any interest in the outcome of the above matter.

In witness whereof, I have hereunto set my hand and affixed my official seal, at

Washington, D.C., USA, this 20th day of June, 2010.

E-signature: D. I. Bunn

Notary Public

My Commission expires January 5, 2012.