U.S. DEPARTMENT OF ENERGY

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ENERGY CONSERVATION STANDARDS FOR COMMERCIAL AND INDUSTRIAL FANS AND BLOWERS

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PUBLIC MEETING

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THURSDAY

FEBRUARY 21, 2013

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The Public Meeting met in Room 8E-089, 1000 Independence Avenue, S.W., Washington, D.C., at 9:00 a.m., Doug Brookman, Meeting Facilitator, presiding.

PRESENT:

DOUG BROOKMAN, Meeting Facilitator, Power Solutions, Inc.
JOHN CYMBALSKY, Department of Energy
BETSY KOHL, Department of Energy
CHARLES LLENZA, Department of Energy

ALSO PRESENT:

KARIM AMRANE, Air-Conditioning, Heating, and Refrigeration Institute
GOPAL BANDYOPADHYAY, Pacific Northwest National Laboratory
ROBERT BOTELER, Principal Confluence Energy, LLC
DONALD BRUNDAGE, Southern Company
MARK BUBLITZ, New York Blower Company

ANDREW deLASKI, Appliance Standards Awareness Project
PAUL DOPPEL, Mitsubishi Electric
JORDAN DORIA, Ingersoll Rand
GARY FERNSTROM, California Investor Owned Utilities
AARON GOTHAM, Greenheck Fan Corporation
DAN HARTLEIN, Twin City Fan
ARMIN HAUER, ebm-papst, Inc.
MICHAEL IVANOVICH, AMCA International
SANAEE IYAMA, Lawrence Berkeley National Laboratory
SAMUEL JASINSKI, Navigant Consulting
CHARLES KIM, Southern California Edison Company
TIM KUSKI, Greenheck Fan Corporation
CHRISTOPHER LAU, Navigant Consulting
ALEX LEKOV, Lawrence Berkeley National Laboratory
ETHAN ROGERS, American Council for an Energy-Efficient Economy
STEVE ROSENSTOCK, Edison Electric Institute
ANIRUDDH ROY, Air-Conditioning, Heating, and Refrigeration Institute
ZIKA SREJOVIC, Twin City Fan
WADE SMITH, Air Movement and Control Association
LOUIS STARR, Northwest Energy Efficiency Alliance
MARK STEVENS, Air Movement and Control Association
DANIEL TROMBLEY, American Council for an Energy-Efficient Economy
GREG WAGNER, Morrison Products, Inc.
MEG WALTNER, Natural Resources Defense Council
DETLEF WESTPHALEN, Navigant Consulting
DAVID WINIARSKI, Pacific Northwest National Laboratory
DAVID WINNINGHAM, Allied Air Enterprises

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

(9:02 a.m.)

FACILITATOR BROOKMAN: Good morning, everyone, and welcome. This is the U.S. Department of Energy's public meeting on energy conservation standards for commercial and industrial fans.

Today is Thursday, February 21, 2013, here at the Forrestal Building, the U.S. Department of Energy.

So glad you could join us this morning. My name is Doug Brookman from Public Solutions in Baltimore. I'll be facilitating the meeting today.

We are going to start off this morning with welcoming remarks from Charles Llenza.

MR. LLENZA: I welcome you to the framework meeting for commercial, industrial, and -- commercial and industrial fans and blowers. And this is our first meeting kicking off the rulemaking here at the

Department of Energy.

So it is -- it won't be as long as yesterday's pump meeting, hopefully, but we still have a considerable amount of slides to cover. And so let's get on with the --

FACILITATOR BROOKMAN: Okay.

MR. LLENZA: -- meeting.

FACILITATOR BROOKMAN: It's our tradition to start with introductions. I'll start to my immediate left. Please say your name and organizational affiliation. It also gives you a chance to get used to turning these microphones on and off. Please.

MR. KUSKI: My name is Tim Kuski. I'm with Greenheck Fan, and I'm here representing AMCA.

MR. HARTLEIN: My name is Dan Hartlein. I'm with Twin City Fan Companies, Limited, also representing AMCA.

MR. STEVENS: I'm Mark Stevens. I'm with Air Movement and Control Association, AMCA.

MR. BUBLITZ: Good morning. Mark Bublitz with the New York Blower Company, also representing AMCA.

MR. IVANOVICH: Michael Ivanovich with AMCA International.

MR. BOTELER: Rob Boteler with Confluence Energy, and I'm helping AMCA.

MR. deLASKI: Andrew deLaski with the Appliance Standards Awareness Project.

MR. FERNSTROM: Gary Fernstrom representing the California Investor Owned Utilities, which are PG&E, Southern California Edison, San Diego Gas & Electric, and the Southern California Gas Company.

MS. WALTNER: Meg Waltner, National Resources Defense Council.

MR. ROSENSTOCK: Steve Rosenstock, Edison Electric Institute.

MR. WINNINGHAM: Dave Winningham, Allied Air Enterprises.

MR. ROGERS: Ethan Rogers, American Council for an Energy Efficient Economy.

MS. KOHL: Betsy Kohl, Department of Energy, General Counsel's Office.

MR. LLENZA: Charles Llenza, Project Manager for the Department of Energy on this rulemaking.

MR. CYMBALSKY: John Cymbalsky, Project Manager for Appliance Standards and Building Codes.

FACILITATOR BROOKMAN: Thank you. Detlef, please stand up.

MR. WESTPHALEN: Detlef Westphalen, Navigant Consulting.

MR. JASINSKI: Sam Jasinski, Navigant Consulting.

MR. LEKOV: Alex Lekov, Lawrence Berkeley National Laboratory.

MS. IYAMA: Sanaee Iyama, Lawrence Berkeley National Lab.

MR. BANDYOPADHYAY: Gopal Bandyopadhyay, Pacific Northwest National Laboratory.

MR. WINIARSKI: I'm David

Winiarski, Pacific Northwest National Lab.

(Off-mic introductions.)

FACILITATOR BROOKMAN: Did we miss anyone?

(No response.)

Okay. And those of you that are joining us via the web, welcome. We're glad to have you with us as well.

Each of you -- everyone I believe received a packet of information as you checked in this morning. I'm going to do a very brief agenda review.

We have already had a brief welcome from Charles and introductions. Immediately following this agenda review, there is an opportunity for anybody that wishes to do so to make brief summary remarks -- brief summary remarks -- surrounding issues that are important to you that you would like to emphasize here at the outset.

There is a lot of content that is contained in the packet. These PowerPoint slides, which will be the basis for both presentation, review, and comment as the day goes on, that is the place to really concentrate and focus your comment. However, we do want to provide an opportunity to raise issues here at the outset.

Immediately following that opening statement segment, we will have an introduction and rulemaking process overview; and following that, authority, definitions, and regulatory options. We will take a break mid-morning, around about 10:30 or so.

Following the presentation and discussion on regulatory regimes, and then test procedures and efficiency metrics, and then market and technology assessment and screening analysis. We will take lunch midday, around about 12:00 or 12:30 or so, whenever we get there.

And then, when we return from lunch, engineering analysis, markups analysis, energy use analysis, life-cycle costs and payback period analysis. We will take a break mid-afternoon, whenever it's appropriate.

And then, following the break, shipments analysis, national impact analysis, preliminary manufacturer impact analysis, NOPR analyses, and then, finally, at the end of the day, some next steps and another opportunity for you to raise issues that you don't think have been adequately covered.

You will have two opportunities in addition to your comment ongoing during the day itself. Okay. So let's make sure you have your opportunity to present the stuff that is important to you.

Questions and comments about the agenda? I see -- I see none at this point.

MR. LLENZA: I have one comment.

FACILITATOR BROOKMAN: Okay.

MR. LLENZA: The schedule in here is incorrect. There is another section before the test procedures and efficiency metrics, which has to do with the -- what's that section called? Regulatory regimes. That's correct. So this went to production early, so we couldn't -- I couldn't make the correction. I just want to make a pen-and-ink correction at this point.

FACILITATOR BROOKMAN: Okay. Well, so then, if you will pen the correction for me --

MR. LLENZA: That's correct. In the handout it's correct. In the presentation it has not been updated.

FACILITATOR BROOKMAN: Great. Thank you. That's helpful. Okay. And so, also, I would ask for your consideration -- many of you were here yesterday, and many of you have participated in these meetings previously. If you would each speak one at a time, please say your name for the record. You'll have to turn the microphone on and off as you have already gotten used to.

If you could keep -- as you say your name for the record, it is important because there will be a complete transcript of this meeting, and that will be made available to you.

Keep the focus here. Please turn your cell phones on silent mode; limit sidebar conversations. If you could try to be concise, there is a lot to be said here. We need to share the air time.

And webinar participants, let me welcome you especially. The Department of Energy is trying hard to make these meetings accessible to folks via the web. If you would please keep your telephone on mute, and using your software, if you wish -- you should raise your hand if you wish to ask a question or comment, and then we will fit you into the conversation as best we can, and you should be miked live into this meeting room right here at the Forrestal Building. At least that's the way it has been working in the past.

So that is the preliminary stuff. Let's start with brief summary remarks about key issues and concerns from anybody that wishes to do so. Who would like to start? Would you like to start, Michael?

MR. IVANOVICH: Yes, sir. This is AMCA's first opportunity to testify in a public hearing, so thank you very much for that opportunity.

FACILITATOR BROOKMAN: Please say your name for the record.

MR. IVANOVICH: Michael Ivanovich, Director of Strategic Energy Initiatives with AMCA International. And on behalf of AMCA International and its members, I'd like to thank DOE for the opportunity to share our ideas on DOE's fan and blower framework document.

AMCA International is a not-for-profit international association on air system equipment manufacturers, primarily fans, louvers, dampers, and air curtains used in residential and commercial buildings and industrial and utility processes. AMCA was founded in 1917 and now has 306 members. Of these, 125 member companies manufacture fans for sale in the United States. And of these, all but seven are located in North America.

Approximately 80 percent of AMCA members are small firms, which have annual revenues under $10 million, and 97 percent have annual revenues under $50 million. AMCA's mission is to promote the health, growth, and integrity of our industry, consistent with the public interest.

Commitment to our mission is evidenced through developing and maintaining foundational ANSI-accredited test standards, an international certified ratings program, a world-class laboratory, and our own international laboratory accreditation program.

In keeping with our mission, AMCA responded to the Notice of Proposed Determination published in June 2011 that we concur DOE has the authority to regulate commercial and industrial fans, and that we would like to collaborate in the rulemaking.

Our position is to work with DOE on a fan -- fan regulation is consistent with our leadership in energy efficient fan systems. In 2010, AMCA published a standard, ANSI AMCA 205, for rating the efficiency of a fan. And, in 2011, we championed the insertion of a fan efficiency requirement based on AMCA 205 and to the 2012 International Green Construction Code.

In 2012, we led the establishment of a fan efficiency requirement based on AMCA 205 for ASHRAE 90.1 2013.

We are currently co-sponsoring a code change proposal to the 2015 International Energy Conservation Code that also inserts a fan efficiency requirement, and AMCA is developing a continuous maintenance proposal for ASHRAE 189.1, the high performance green construction standard. All of these efforts amount to years of consensus-building and public peer review.

AMCA's contribution on the DOE rulemaking extends to working with advocates on a joint proposal to DOE which could inform them of what a fan efficiency regulation could look like, and this includes working closely with ACEEE, ASAP, and the National Resources Defense Council, and other advocates.

But despite the considerable talent available, this regulation won't be easy. AMCA and its members believe that caution is needed. Fans of commercial and industrial scale are extremely complex. There are many types of fans on the market to meet the diverse needs of fan applications, and the behavior of fans is highly sensitive to proper sizing and selection practice, as well as installation and operation. There are many opportunities for unintended consequences.

AMCA has reviewed -- okay. So, consequently, AMCA's fan efficiency standard not only defines how to rate a fan's efficiency; it also requires that fans be sized and selected to operate within 15 percentage points of their peak efficiency.

In other words, the AMCA 205 standard seeks to impact the design community, not just the manufacturing community. And all current and proposed codes and standards for the fan efficiency language written around AMCA 205 adopts the sizing and selection requirement.

AMCA has reviewed the framework document in some detail and commends the considerable effort and talent that went into it. We do have questions and proposed changes about the scope, equipment classes, and efficiency metrics.

In this presented framework, we found areas where potential energy savings can be easily compromised by conventional practice, and we also found that there will be areas where there could be considerable undue regulatory burden on small businesses, and we look forward to talking to you about these issues today. And, again, thank you very much.

FACILITATOR BROOKMAN: Thank you. Other issues here at the outset? Andrew deLaski.

MR. deLASKI: Andrew deLaski, Appliance Standards Awareness Project. I want to also thank the Department for initiating this rulemaking. As the Department has shown, fans use a considerable amount of energy. On a national basis, about six and a half percent of electricity consumption is used to power fans according to the data presented in the RFI.

So there are significant opportunities here. Even small improvements in fan efficiency offer the potential for significant savings on a national basis, even as you start to carve down to product classes that make sense, coming up with a set of fans that make sense for a standard.

So we think this is a very promising endeavor for the Department, for delivering cost effective energy efficiency savings, and we appreciate DOE's work to get it off the ground.

I also want to thank AMCA, Michael and the team at AMCA, and the manufacturers who reached out to us early -- very early in this process after the RFI was published to begin a relationship to help to educate us, the advocacy community, about fans to improve upon our existing base of knowledge about the opportunities and also the constraints in improving fan efficiency through standards.

As you've indicated to DOE in a letter that we sent last fall jointly with AMCA, it is our ambition to work with AMCA and the manufacturer to come up with a joint recommendation. We are in the very infancy stage of that process, but that is our ambition. And that joint recommendation, as Michael has indicated, we would hope could help form the basis for a DOE regulation eventually.

We have only just begun this work. DOE's framework document helps to frame the key issues.

With respect to the key issues that are outlined in the framework, characterize them as scope and exemptions, product classes, the approach for standards, test methods. These are all the critical issues. Indeed, we have done an excellent job of outlining them with the work that has gone into the framework and appreciate the time and effort that has gone into that.

Our views on these issues are still forming. We look forward to learning more today, in the weeks ahead, and in participating actively in the discussion today and beyond.

FACILITATOR BROOKMAN: Thank you, Andrew.

Other comments here at the outset?

Please. Please say your name for the record.

MR. ROY: My name is Aniruddh Roy, Air-Conditioning, Heating, and Refrigeration Institute. We would like to know on what basis DOE developed the framework document for commercial and industrial fans and blowers? Currently, there are requirements in place within ASHRAE Standard 90.1 for fans and HVAC applications.

For example, there is a Section 6.5.3 that effectively limits power consumption per CFM. The framework document seems to suggest that there are no existing requirements for fans in HVAC applications. And the only mention of ASHRAE Standard 90.1 in the framework document, which is about 78 or 79 pages, is during the discussion of the FEG requirements in Addendum U.

However, the framework document fails to mention any of the exceptions that are mentioned in that addendum as well.

DOE, as far as we know, is required

by the Energy Conservation and Production Act, to review the latest revision of ASHRAE Standard 90.1, and determine whether the revised code would improve energy efficiency in commercial buildings.

If the determination is positive, states must, no later than two years after the date of publication of such affirmative determinations, certify that they have reviewed and updated the provisions of the commercial building codes to meet or exceed the requirements of ASHRAE 90.1.

We feel that in the course of reviewing ASHRAE Standard 90.1 DOE should not have simply ignored the work that has been done over the years to develop fan requirements by the 90.1 Committee.

DOE's energy consumption estimates in the June 28, 2011, Notice of Proposed Determination of Coverage, did not include any analysis on the energy savings that have been achieved through the adoption of ASHRAE

Standard 90.1 by states over the years.

As far as AHRI is concerned, a regulation on fans and blowers that are used in HVAC applications will simply lead to complications, since such fans and blowers are designed and installed as part of a larger HVAC system rather than stand-alone components.

Setting energy conservation standards for such fans and blowers will not ensure an optimized energy savings solution for applied HVAC systems.

MR. LLENZA: This is Charles Llenza, Department of Energy. We acknowledge your comments, but we are in the Appliance Standards Group. The Codes Group is a separate group. We will consult with our colleagues in terms of the preliminary analysis.

But I also have to state that the ASHRAE standard has a little bit more of a broader range of issues that we do not cover within the Appliance Standards Group. So it is a different forum.

We appreciate your comments, but our mission here at the Appliance Standards Group in the Department of Energy is to actually regulate the appliance, not the building, not related to building codes, not related to the structural building itself, but to the actual equipment that comes out of production from a manufacturing facility.

But your comments are well taken, and we will be consulting with the Codes Group for any impacts on our rulemaking.

FACILITATOR BROOKMAN: As the day proceeds, let's see how and if it intersects. We'll see.

Yes. John Cymbalsky.

MR. CYMBALSKY: John Cymbalsky, DOE. I guess I manage the Building Codes, too, so maybe I should address this.

(Laughter.)

So the Department obviously

appreciates everything the ASHRAE committees do. We participate actively in ASHRAE 90.1, in particular. However, I think there may be a little confusion as to what ASHRAE does and what DOE appliance standards regulations do.

You know, the appliance standards program sets minimum efficiency standards that are federal law. ASHRAE's recommendations are not federal law. However, the Department can look at ASHRAE and compel states to adopt that code through its process.

However, this is a separate -- as Charlie said, this is a separate process. We are going to be looking at these fans and blowers separately from the building codes, but relying heavily on what ASHRAE has done. Obviously, that is a big part of the input to this process, so we will not ignore what is in the ASHRAE 90.1. We will not ignore any test methods or anything else that ASHRAE or other organizations may have come up with in this process.

So actually I think it's great that ASHRAE has done a lot of good work in this area. That is going to help us move forward on this rulemaking.

I will also put in a plug for a meeting we are having next week on Tuesday for a new Federal Advisory Committee that has been formed here at the Department. One of the charges that this new Advisory Committee will have is to form working groups to explore the possibility of negotiated rulemakings for certain products.

As both Michael and Andrew have already addressed, that there has been some early conversations as to whether or not this product could be a good one to explore that possibility of a negotiated rulemaking. And we at the Department hope that this is a path that more products will go down as opposed to a notice and comment type rulemaking.

The negotiated rulemaking is such that we could have several meetings where we all sit around this table here, and in real time we can negotiate all aspects of the rulemaking. And so we're hoping that the fan manufacturers, and AMCA in particular, will consider this as an option, if in fact the ASRAC committee decides that this product would be a good one to move forward on.

So that meeting will take place in this room on Tuesday, February 26th at 9:00 a.m.

FACILITATOR BROOKMAN: Okay.

MR. CYMBALSKY: At 10:00 a.m., excuse me. 10:00 a.m.

FACILITATOR BROOKMAN: Ten. Thanks. Thanks very much.

Don Brundage.

MR. BRUNDAGE: Don Brundage, Southern Company.

FACILITATOR BROOKMAN: Don, will you leave that thing on, once it's on? Thank you. We should get a piece of tape.

MR. BRUNDAGE: I'm a bit confused

on the --

FACILITATOR BROOKMAN: Don, it's still not on.

MR. BRUNDAGE: Now?

FACILITATOR BROOKMAN: Yes.

MR. BRUNDAGE: Okay. I'm a bit confused on the regulatory scheme we're operating under. The way I had always understood the way the process works, you had residential type or directly -- appliances that were directly listed in federal regulations that were regulated directly by DOE, and then you had the ASHRAE products where DOE was to consider the efficiency levels of ASHRAE, give deference to ASHRAE, and if they decide that there is evidence that the standard needs to be higher, then DOE might set a higher one.

What you're saying now is that this is a product that would have the residential type regulation, and you are directly doing it without deference to ASHRAE.

FACILITATOR BROOKMAN: John Cymbalsky.

MR. CYMBALSKY: Okay. I'm going to be half lawyer/half whatever else I do here.

(Laughter.)

So you are -- so there are a list of ASHRAE products that, in fact, we follow that process that you just described. This, however, is not one of them. This is under Section 6311 of 42 USC.

The types of equipment, blah, blah, blah, blah, blah, but it lists several things that are called out in the statute for us to follow this rulemaking, what you called consumer product type rulemaking -- compressors, fans, blowers, et cetera, et cetera, et cetera. So we are operating under this section of the statute, so 6311(2)(B).

MR. BRUNDAGE: And 6311(2)(B) does not imply residential and fans, blowers. It's all fans --

MR. CYMBALSKY: Correct.

MR. BRUNDAGE: -- and blowers?

MR. LLENZA: It's commercial.

MR. CYMBALSKY: This is commercial and industrial --

MR. LLENZA: Right.

MR. CYMBALSKY: -- fans and blowers.

MR. BRUNDAGE: Okay. Thank you.

FACILITATOR BROOKMAN: Okay. Thanks for that clarification. That's helpful.

Karim? Karim Amrane.

MR. AMRANE: Karim Amrane, AHRI. I would like to respond to John's comment. I'm glad to hear that DOE is going to be looking at ASHRAE 90.1 and the work that ASHRAE 90.1 has done. But so far, if we look at all the analysis that was done so far, your RFI, your justification to be here today, you have not accounted for anything that ASHRAE has done. Okay? You are assuming that there is nothing in place today, and there have been requirements on fan for decades in ASHRAE 90.1.

So what I'm saying, I'm glad to hear that DOE is looking at ASHRAE, but you should be looking at ASHRAE, because there are things in place today.

Thank you.

FACILITATOR BROOKMAN: Thank you. Okay.

So now I'm going to go to Charles Llenza. He is going to provide an overview.

MR. LLENZA: Okay. So just a brief introduction here. The purpose of today's meeting is to present our proposed analytical approaches to be used to evaluate the energy conservation standards for commercial and industrial fans and blowers.

It is also to inform the interested parties here on -- in terms of what our plans are for the rulemaking, also to facilitate comments from the stakeholders and advocates, also to provide a forum here for public discussion on these issues, and to encourage all parties attending and those attending on the webinar and other parties that have not been able to attend, to provide their information, written comments, and other material, as appropriate.

We will be using these blue request comment boxes throughout the process here for specific questions that the Department has. And these are the highlights of what the Department seeks in terms of comments from the stakeholders in terms of particular issues we discuss as we go through the presentation.

I may note at this time that the framework document has a whole section on questions that the Department has to the industry, and I would appreciate as much responsiveness from the industry on those comments, not necessarily at this meeting but within the written comment process, and which we have extended the comment period to May 2nd, which we understand the complexity and the need for a little bit more time to evaluate the Department's framework proposal.

Okay. And we do have a specific way of submitting these comments, and we would like for you to provide a docket number and/or RIN number that is related to this particular rulemaking.

We have an electronic email box, which you can submit your comments through, or you could use the postal mail or a courier, but we would prefer the electronic method of delivery.

And, once again, I want to emphasize that we have extended the comment period to May 2, 2013, in lieu of the sensitivity of the time needed to review appropriately the framework document.

Any questions on this so far?

(No response.)

Okay. Rulemaking process overview. EPCA, the Energy Policy and Conservation Act, as amended, contains at least 12 types of industrial equipment that are considered covered equipment under the statute, that the Secretary of Energy is authorized to establish energy conservation standards.

As John was mentioning, fans and blowers are two of the specific types of industrial equipment that are under the statute 42 USC 6311(2)(B). EPCA also directs DOE to develop new and amended standards designed to achieve maximum improvements to energy efficiency that are technologically feasible and economically justified. And this rulemaking process that the DOE provides -- and schedule -- helps us do just that.

EPCA directs DOE to consider some factors in the analysis. And as you can see in the first column, those are the EPCA requirements. There are seven of them. And the corresponding DOE analysis is in the right-hand column. And throughout the next three years of the rulemaking, or whatever timeframe it takes, we will be going through that analysis, corresponding analysis.

So let me talk a little bit about the rulemaking process timelines. This is our standard timelines. We do have other rulemakings that may be accelerated. There is also a negotiated rulemaking process that John has mentioned that is encouraged by the Department. But this is our standard process based on the statute, and for Fans and Blowers we have -- it is three years.

We are at the framework document point. We will have a preliminary analysis after this; a Notice of Proposed Rulemaking, which is a draft rule; and then we will have a final rule published hopefully in the three years..

At the same time, there is a test procedure process that is integrated within the timeline of the energy conservation standard rulemaking, but it is a separate process. It parallels the process.

Just to mention that the test

procedure is key and critical in establishing the metrics for the energy conservation standard. So as part of the integrated rulemaking process for fans and blowers, this is the methodology we would be using here to get both the energy conservation standard and the test procedures processed issued by the Department.

The test procedure is usually a year and a half. It depends on the level of complexity. And, again, the rulemaking -- energy conservation standard usually takes three years. There is additional information at that website, if you care to look at more detail of the process.

I'm going to talk a little bit about these chevrons for the energy conservation standard. Today we are at the framework document. It provides an overview of our rulemaking process and encourages early participation of interested parties, because we are starting at the beginning here of the rulemaking at the Department of Energy.

We invite comments at all times of our proposed approach and issues. And we -- this is just a listing of the framework document that was -

- issued the notice that was issued in the Federal Register February 1, 2013.

From the framework process, we will go into preliminary analysis mode. It is planned for quarter -- third quarter of 2014. We plan to have in the Federal Register Notice announcing that process to formally start. They will have another meeting just like we're having today, and you can see that we will provide you a listing of the preliminary analysis that the Department has developed by that timeframe.

In addition, we will be discussing your comments received from the framework document and incorporating to the best of our abilities the improvements to the DOE process for the rulemaking.

From the preliminary analysis, we will be -- also we will be developing a TSD, technical support document, with all of the material of the data that we utilized to provide the analysis and the analysis itself.

From this point, we will go to a Notice of Proposed Rulemaking. Again, that is a draft of what we think the standard levels will be. We will have discussions of the comments received in response to the preliminary analysis and TSD.

And it will refine the analysis the Department has provided in the preliminary analysis, and we will have more detail in terms of the levels based on what is economically justified and technologically feasible.

And that would be subject to public comments. We will have another meeting, and we are planning to do that in the second quarter of 2015.

Okay. So the final rule hopefully

will be issued in about three years. The process always incorporates comments from the stakeholders. I think that's critical to keep in mind. We're sensitive to your comments. We will respond to your comments within the documents.

And we will make all of the -- any adjustments that we have to make to the technical support documents. And then, once these levels are finalized in the final rule and published, they become the standard. That is planned in the first quarter of 2016.

Okay. What does that look like? Here is our comprehensive schedule integrated with the test procedure, so that you can see how the test procedure is linked to the energy conservation standard.

We issued the framework document in January 2013, and then today we are having the public meeting. You can see that the next public meeting and major document will be a test procedure NOPR, which is basically our proposal for what the test procedure should look like.

And then we will have a preliminary analysis public meeting at some point after we release the preliminary analysis documents in the Federal Register. The test procedure will be finalized somewhere after 2015, and then that will be followed by a Notice of Proposed Rulemaking, which is in the draft rule.

We will have another meeting in the second quarter of 2015. And as you can see, the completion date, the final rule.

This is the road map for us to how to get from A -- from today's meeting, which opens up the rulemaking, to completion of the mission here at the Department for the rulemaking.

Three years later after we have published a final rule, the standards that the Department issues become effective. In other words, there is plenty of time for the industry to get ready for those new standards.

And one of the things that we need to keep in mind is that it is not happening overnight. We are talking six years out. Okay.

FACILITATOR BROOKMAN: Michael?

MR. IVANOVICH: Michael Ivanovich, AMCA International. Could you just discuss a little bit how a joint recommendation or a negotiated ruling would impact these steps?

MR. LLENZA: Well, I'm envisioning that parallel to this timeframe for our test procedures and the energy conservation standard rulemaking. You will have another process where the Department and the advocates and the manufacturers and all of the parties of interest are talking to the Department about information needed, that we are providing or information that they may have, in terms of what they think should be regulated, what should be -- what standard level should be used, et cetera.

And I would think that as we issue more analysis from the Department that the industry would look at what we are proposing and then use that information that they may have to then propose back to us whatever levels. And John may want to say a few words --

MR. CYMBALSKY: Yes. Let me try to clarify it a bit. So a joint recommendation could be submitted, and the Department would consider it as part of this process that you see here. Now, if you wanted to go the negotiated rulemaking path, in that the process would be different than this. We would have meetings that are set.

And depending on what the working group -- if the working group is formed, the working group itself sets sort of the schedule, you know, with the Department buy-in obviously.

And at that point, any negotiated outcomes that come out of that process would go into a proposal. So it would go into the NOPR in here.

So the Department's fallback position would be this, in case the negotiations don't have a fruitful outcome.

FACILITATOR BROOKMAN: Right. This process will proceed.

MR. CYMBALSKY: Correct. Independently. With the same data and the same -- you know, understanding that we are going to be doing both at the same time. So the same people, you know, the consultants that we rely on to do the lion's share of the analysis here will be in both processes. So, yes.

FACILITATOR BROOKMAN: Karim.

MR. AMRANE: Karim Amrane, AHRI. To follow up on that, who is going to decide whether there is going to be a negotiated rulemaking? It's going to be this Advisory Committee that is going to make that --

MR. CYMBALSKY: Yes. So on Tuesday we are going to -- John Cymbalsky, DOE. On Tuesday we will have our first meeting of this new committee, and at that time the agenda will allow time for proposals of working groups to be formed.

I can say that the Department -- this is one of the products that has been mentioned, because we have received your letter, and so obviously this is one that on behalf of the Department I could say we are definitely interested in, and hopefully you are as well.

FACILITATOR BROOKMAN: Okay. Thank you for that clarification.

Charles, let's go. Oh, we have one more question. Your name, please, sir.

MR. SMITH: I'm Wade Smith from AMCA.

FACILITATOR BROOKMAN: Yes.

MR. SMITH: Originally, there was some discussion about a negotiated outcome that involved interested parties from the manufacturers and interested advocates on the environmental side. And from your comment a moment ago, I understand that that path is still available to us, and that the outcome of that discussion/negotiation would inform this process. Have I got that right?

So I guess my question is, could you compare and contrast your view in terms of how that process compares to a negotiated process and why the Department is interested in raising the specter of negotiated process at this time?

MR. CYMBALSKY: A specter. Okay.

(Laughter.)

I actually thought it was a good thing.

(Laughter.)

Okay. So for those who come on Tuesday, I guess I will repeat myself. But, okay, so what ASRAC will do will present options to charter working groups, whereby interested stakeholders could nominate themselves or others to be a member of this working group whose job it will be to negotiate an energy conservation standard or all parts of the standard with DOE's involvement.

And what we learned from our first foray into this with transformers, we actually have three types of distribution transformers that we tried to negotiate a standard for. We got one out of three. That's -- I don't know, you get eight million a year in baseball for one out of three, so I'm going to call it a win.

(Laughter.)

You know, and for what it's worth, there's a few others in this room who were part of that process.

Now, we could all say at the end of the day we may not have got to where we wanted to get to, but nobody -- all 25 people in that process agreed that it was far better than the normal notice and comment rulemaking that we do, because in real time people were discussing, hey, how about this level, that level, what if we give here, we get there, what's the numbers that would, you know, surround that outcome.

And we'd have our consultants in the room on their laptops in real time producing analysis, and I think having that back and forth over a few days in a row, you know, real concentrated work, I think most people in the room found that a little less black boxy, if you will.

All information was out on the table. If you wanted to provide information that was business confidential, or you didn't want it to be disclosed, you could sign these non-disclosure agreements and talk to the consultants in the hallway, and, you know, we would mask that data.

But personally I think having a negotiated outcome at the end of the day means after the fact that the chance of litigation is smaller, you know, from the Department's point of view. That's not to say it won't happen. But we think that if everyone in the room and all of the key stakeholders in the room are negotiating and they say yes, we think that's a better outcome than the alternative.

So I strongly -- on behalf of the Department, we strongly encourage that process.

FACILITATOR BROOKMAN: Andrew deLaski.

MR. deLASKI: Just a couple of comments. One is John and Charlie, I mean, you -- I think you made it very clear, you used the word that they are independent of one another.

FACILITATOR BROOKMAN: Is your microphone on?

MR. deLASKI: Independent. The light -- it's lit up.

FACILITATOR BROOKMAN: Okay. Thank you.

MR. deLASKI: Maybe it's not close

enough. Is that the issue?

FACILITATOR BROOKMAN: Yes.

MR. deLASKI: All right. You know, in the sense that, as you have just described, this team of consultants is there in the room. You or your designee is there in the room, so the folks who are running the rulemaking, the normal rulemaking if you will, are the same folks who are engaged and supporting the reg neg.

Okay. I see you nodding, so I think that's an important -- you know, so my understanding of it is that you still have an obligation and a commitment to follow through on the schedule that Charlie has described. So that is going to happen.

But what's happening in the reg neg can't help but to inform what happens there, whether or not we ultimately -- the participants in the reg neg reach a consensus in the end, because if it's not working like that then, you know, we are all going to go away, because it's going to be -- it's like we're going to be frustrated, right?

Because what's going to happen is that, the way I would envision something like this would work, is that it would be difficult, I would suspect, to complete this prior to the preliminary technical support document being published.

Both time-wise in terms of -- also, information and data-wise, right? Because we -- our deliberations of any committee, it seems to me, would be informed by the analysis that is being developed prior to the PTSD, the preliminary technical support document, and that we are going to be discussing today as we go on, and also by the things that build up to that.

So what I would hope would happen -- and I did with respect to the transformer process -- is that there would be more sharing by the Department of its analyses that build up to that PTSD document, enabling us -- and then also an opportunity for the stakeholders to influence what goes -- the product classes, the definitions, the testing, that become the underlying foundation of that PTSD, and that there is -- it's a more iterative process.

As opposed to us talking to you here today, submitting comments on May 2nd, and then we wait for however long it is, more than a year, right, to see what comes out of that process. That is more of an ongoing engagement with everybody around the same table. So that is kind of how I --

MR. CYMBALSKY: And Andrew is the co-chair of ASRAC, so he has -- he is speaking with authority here, actually.

MR. deLASKI: And that -- to me, the difference between this process and the transformer process is that we have more time. In transformers we had to do three -- basically three classes in three months, and it was difficult, given that compressed timeframe.

FACILITATOR BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. To follow on, I also participated in the process. And one also key difference is in that process we are just only talking about the efficiency standard. There was no discussion -- we didn't have to have any discussions about test procedure.

So the efficiency metrics were already established, but this product, unfortunately, right now there is no -- we haven't even defined the efficiency metric yet. So it is kind of hard to talk about the standard when you haven't agreed upon the efficiency metric yet.

So in this case, in terms -- again, it unfortunately might be harder -- a higher hurdle in the fact that there is a timing of the test procedure as well as the efficiency standard, because if there is no I'll say draft test procedure by the time of the preliminary analysis, that can make negotiations a little tougher, too, because again you might need -- for this case, you might need to negotiate both the test procedure and the efficiency standard.

MR. CYMBALSKY: Yes. I guess -- John Cymbalsky, DOE. I guess I should -- you know, I thought I would point it out, that the whole scope of the rulemaking is part of this negotiation. So, obviously, the efficiency metric and product, all of that stuff is sort of on the table to negotiate.

And I think if a working group is established for this, personally having been through a bunch of these, I think -- I would just say I -- in my opinion, I think you'll find it more intellectually stimulating to do than --

(Laughter.)

-- negotiated rulemaking. And I -- and, again, I think we were -- we didn't get consensus on the three products for transformers. We did get consensus, 25 out of 25, that that process was better than the one Andrew just described a few minutes ago. So --

FACILITATOR BROOKMAN: Michael, do you want to -- no? All set. Okay.

MR. LLENZA: This is Charles from the Department. I just want to point, if you look at the schedule, that's the plan. The test procedure will be -- the NOPR, at least you'll get a good idea what the test procedure, what we're planning to do with the NOPR and the Notice of Proposed Rulemaking for the test procedure before the preliminary analysis.

So usually by the time we're issuing a NOPR for a test procedure we have laid out the test plan.

MR. CYMBALSKY: John Cymbalsky, DOE. And I would propose that if in fact a working group is chartered under ASRAC that we would begin work before that first green dot, so that there would be some analysis that the Department is working on prior to publishing any of those documents where there would be input from the working group into the numbers. And I would say that that is not a bad thing, so --

FACILITATOR BROOKMAN: Final questions on this subject before we move on?

(No response.)

Okay. Now back to the content here in the slides and Charles Llenza.

MR. LLENZA: Yes. Section 3, authority and definitions. The Department has the authority under EPCA, Title 3, Part C, as amended, set forth, various provisions designed to improve energy efficiency in commercial and industrial equipment.

If you look at Section 6311, that is where it talks about it includes fans and blowers. And that is why we have kicked off this rulemaking today.

The manufactures must use DOEprescribed test procedures to establish compliance with the standard sets for commercial and industrial fans. Again, I am just -- this is just emphasizing that the test procedure is an integral part of this process, because the test procedure is what will provide the metrics for us to establish the energy conservation standards.

Okay. So definitions. While we don't -- we have the authority, we currently don't have definitions in terms of what -- in terms of what is a fan and what is a blower under the commercial and industrial section here of EPCA.

So the Department has proposed a series of definitions. I will just read the headlines, and you can read the definitions in particular. So we have proposed definitions for commercial and industrial fans, for what a fan manufacturer is, what an axial fan is, what a centrifugal fan is, cross-flow fan, mixed flow fan, and what we describe as a blower, and what a safety fan would be.

And fan types, inclusion of all fan types, axial, centrifugal, mixed flow, and blowers. And we are looking also at the physical and performance criteria for the standards, so we're looking at the impeller diameter, transmissions of all types, and the rotation speed, speeds up to 8,000 rpm.

So the important comment box. Item 2.1, DOE requests data on how fans are sold; 2.2, DOE requests comments on the suggested cross-flow fan definitions; 2/3, DOE requests comments on the suggested blower definitions; 2/4, we request comments on the suggested safety fan definition; and 2/7, DOE requests comments on fan coverage as fans are defined in the framework document.

So getting back to the point, this is the beginning of the rulemaking. We are trying to set the foundation of what we're doing here. We have some proposed definitions, and what we are requesting at this point in time is that the advocates and the parties attending this meeting weigh in on those definitions.

FACILITATOR BROOKMAN: Okay. So you can see the request for comment. And, first of all, let me ask AMCA directly, do you have data? Have you been collecting data that would be helpful to the Department?

MR. IVANOVICH: We have some data, but we would like to thank the Department of Energy for granting the 45-day extension, because upon reviewing the framework document it was obvious that there is a lot more data that we are going to need to answer those questions decisively.

So there is a lot -- you know, some data that we have that we will be able to provide as part of the written comments, but there is a lot that we don't.

FACILITATOR BROOKMAN: Yes. And is that -- does AMCA typically survey its members to obtain data like -- I mean, is this a convention?

MR. IVANOVICH: We have a statistical program that -- it is a voluntary basis, because by law it has to be voluntary. And the reporting is in sales dollars, not in units and things of that nature. So there is a lot of work that we have to do to extract data from our members in a way that the Department can use them.

FACILITATOR BROOKMAN: I don't wish to pry, and I don't wish to put you on the spot, but I do want to see -- get sort of a sense of your capacity to get this done.

MR. IVANOVICH: Well, it is voluntary. So we are engaging in that process now, and we have high hopes and expectations that we will be able to provide some data to the Department of Energy. That is why we asked for the extension. We have to get it.

FACILITATOR BROOKMAN: Okay. Thank you. Yes.

MR. LLENZA: I will also -- at this

point in time also encourage those parties that make comments about the ASHRAE Committee definitions and other issues that are going on with fans and blowers to weigh in heavily here, so that you can provide the transparency from what is happening in ASHRAE into our rulemaking. It's a great opportunity to, you know, get this started off on the right foot.

FACILITATOR BROOKMAN: Great. Gary Fernstrom.

MR. FERNSTROM: Gary Fernstrom. I think the generalized issue here is that definitions are important, because they may merit different efficiency level treatments in the regulation. The concern is that the definitions be definitive enough, so that a loophole is not created.

To give you an example, years ago DOE set a regulation for incandescent reflector lamps. It turns out that bulbous reflector lamps, a specialized type of reflector lamp, were exempted, and today virtually all of the reflector lamps, incandescent ones that are sold, are bulbous reflector lamps.

So that caveat in the definition created a loophole, which effectively made the regulation useless. So we want to be careful in our definition, so that we don't, for example, find a large number of safety fans being sold for other applications creating a loophole.

FACILITATOR BROOKMAN: Right.

MR. FERNSTROM: Thank you.

FACILITATOR BROOKMAN: In just a moment, we are hoping to get your comments, perhaps preliminary comments -- maybe you have developed this -- on these definitions you have. That's good to see.

Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock Edison Electric Institute. Just a quick follow-up on the definition of safety fan. And, again, the following slide is -- is the idea to exempt safety fans from the regulation just because of low operation hours and very specific requirements for those fans? And then I have a follow up.

FACILITATOR BROOKMAN: Charles?

MR. LLENZA: I think the issue with safety fans, again, is the word "safety." Some of these fans are not designed to be most efficient, but they may be designed to blow out air or material in order to preserve life.

So at that -- you know, I think we have issues with safety, safety equipment, that we would not subject them to necessarily to any kind of regulatory regimen, because they are not -- they are not the normal fans, they are not the normal equipment fans.

They have to perform maybe to a higher grade of efficiency, but not necessarily in the most efficient manner. So --

MR. ROSENSTOCK: Okay. Steve Rosenstock, EEI. I appreciate that, and, you know, I'm especially thinking of like for commercial buildings you have the smoke exhaust fans and the pressurization fans, fans that are designed for emergency conditions only, where they are only going to operate maybe once a month for code compliance tests to make sure they're working, or in the case of a real emergency, and that's it. So they're operating maybe two hours a year or not -- you know, maybe six hours a year, half an hour a month or something like that. So I would agree with that.

My other question -- my other thought -- my question -- again, it's a definition, so it's kind of getting in the weeds, is you just said right here under axial or centrifugal fan, are there other types of fans used in these environments?

MR. LLENZA: At this moment, you know, I don't know if -- Alex, do we know of any other? Just come up to my microphone.

FACILITATOR BROOKMAN: Find a

microphone, Alex.

MR. LEKOV: Alex LEKOV, Lawrence Berkeley National Laboratory. At this time, the Department is open for any suggestion of fan types that could be included in the category of safety fans.

FACILITATOR BROOKMAN: Okay. Andrew deLaski?

MR. deLASKI: If you could go back a slide, Charlie? There was -- where your comment boxes were.

MR. LLENZA: Oh, okay.

MR. deLASKI: So I'm having trouble tracking here, because in the document, Item 2.7 is something different. So I'm just -- in terms of tracking in the framework, Item 2.7 is a different questions. So is there -- is that --

MR. LLENZA: It could be a mistake, so we'll just have to make corrections to this.

MR. deLASKI: Okay. Just have to

go along and --

MR. LLENZA: I'll have --

MR. deLASKI: -- backtracking the item numbers here. It would be good to -- hopefully, this is an exception, an anomaly.

But I also want to ask, you are requesting comment on fan coverage as fans are defined in the framework document. So my question is, at what point does the Department anticipate defining coverage? So let me be -- let me give a specific example.

So, Steve, we talk about safety fans. There seems to be pretty much, you know, an open question here about whether safety fans would be covered at all, right? So you have a standard for safety fans because -- for the reason Steve just described.

So at what point would the Department, you know, address issues of whether particular types or classes or definitions of fans are indeed a covered fan?

MR. LLENZA: I think that, you

know, we would have -- according to the schedule, it's probably at the preliminary analysis stage.

Now, if there is a possibility of us issuing --

MS. KOHL: This is Betsy Kohl, DOE General Counsel. I mean, obviously, we don't make final decisions until the final rule. Right? So we take input and we potentially narrow issues as we move along.

MR. deLASKI: Right.

MS. KOHL: And in the proposal, you know, you'll get the best idea of the Department's proposal for what we think the scope should be. And then, again, we take comments and consider it and then there is your final rule. So --

MR. deLASKI: Okay.

MS. KOHL: -- definitive decisions are not made until the end.

MR. deLASKI: Right. Because it just strikes me that the issues of what is in and what is out will be very much live issues --

MR. LLENZA: All the way through.

MR. deLASKI: -- through this process.

MR. LLENZA: Right.

MR. deLASKI: And telling you today what should be in and what should be out strikes me as being an impossibility.

MR. LLENZA: But we have to start somewhere.

MR. deLASKI: Right. But I think it -- exactly, but --

MR. LLENZA: So --

MR. deLASKI: Thank you.

FACILITATOR BROOKMAN: Louis.

MR. STARR: Louis Starr, Northwest Energy Efficiency Alliance. I think I would encourage Department of Energy to investigate a definition of safety fans. A lot of times a safety fan can just be a regular fan that is pressurizing a stairwell and it doesn't really have -- the same fan could be used in another application.

Also, fans in an actual building system can use -- the air handling system can be used to pressurize fans above and below a floor in order to do a smoke pressurization system. So unlike pumps where it might have a little more clearer defined definition, I would look into whether just a safety fan could just be a regular backward inclined fan that is sold for a lot of applications, has a high static pressure, and can maintain that. So I would encourage them to take a look at that.

FACILITATOR BROOKMAN: Michael, you're next.

MR. IVANOVICH: AMCA is prepared to talk about classes in more detail and make some recommendations for exemptions on safety fans. So we are going to --

FACILITATOR BROOKMAN: Okay. And also, we wish to, as reflected in the comment box, get your details, your best thinking on these definitions.

Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Again, in terms of -- you know, again, it is always making the definition, but then saying just have -- if possible, you know, just have the separate categories for the types of fans specifically you're talking about, such as smoke exhaust fan, you know, or stairwell pressurization fan, where, you know, maybe it's -- not only it's a safety fan but also there's a functionality where you know specifically it's not a general air handler.

It can also pressurize a floor. It's a specific safety -- or I would also say health -- it could be carbon -- you know, a carbon monoxide detector in a garage where that -- there is a specific fan just for that, you know, example. So --

FACILITATOR BROOKMAN: Okay. Dave.

MR. WINNINGHAM: Dave Winningham,

Allied air. We're a division of Lennox, and we manufacture a variety of residential and commercial products that employ, you know, fans and blowers that can be used in these.

One of our key concerns is the potential passout line could take this regulation to the component level. You know, a fan manufacturer can manufacture a fan that can be used in a variety of products, residential, commercial, covered, non-covered, and it could be the same component.

I would caution DOE in, you know, due care needs to be taken that we understand those intricacies, and the definitions around this is critical. But also, once it's defined, if it's something that's used in multiple applications, where does it fall?

FACILITATOR BROOKMAN: We have a -- someone online, Jay Perkins has raised his hand or -- and so, Jay, go ahead. And speak loudly, and let's see if you come in -- if we can hear you here in the room.

MR. DOPPEL: Yes. This is actually Paul Doppel. Jay and I are on the same line.

FACILITATOR BROOKMAN: Okay.

MR. DOPPEL: And --

FACILITATOR BROOKMAN: Go ahead, Paul.

MR. DOPPEL: With Mitsubishi Electric. And the comment that we have is that with the definition of industrial fans and blowers, commercial and industrial fans and blowers, I think it would be appropriate to specifically exclude those that are used for comfort, heating, and cooling, just to make sure that there isn't an overlap.

FACILITATOR BROOKMAN: And so you need to say why.

MR. DOPPEL: Well, just to avoid any confusion of -- because a lot of manufacturers do have air handlers/blowers that are used with outdoor units and split system applications. And there is a -- just want to make sure that those wouldn't be included in this rulemaking, because there is already -- we are already incorporated within other systems.

FACILITATOR BROOKMAN: Oh, okay. Okay. Thank you, Paul.

MR. LLENZA: And this Charles Llenza, the Department of Energy. I suggested you would send us a written comment with the detailed reasons as to why we shouldn't be mixing apples and oranges I guess.

FACILITATOR BROOKMAN: I'm eager to get to these definitions, but, Gary, go ahead.

MR. FERNSTROM: Well, just a quick question. I don't quite understand why the components in another system that may be regulated shouldn't themselves be regulated, because it seems to me whether a fan is going into a furnace system or not it wouldn't hurt to have a fundamentally efficient fan to put in there. You know, compounding regulation doesn't seem to me to be so much a problem as an opportunity.

FACILITATOR BROOKMAN: Is it Aniruddh?

MR. ROY: You've got it correct. Aniruddh Roy, AHRI.

FACILITATOR BROOKMAN: Yes.

MR. ROY: To answer that question, as far as covered products are concerned, there are already efficiency metrics out there that capture the overall efficiency of a system. And the fan, as a component of a system, you know, as far as applied products are concerned, the fan, as a standalone components, its performance may be significantly different from how its performance is within the system.

And so at least for covered products, as far as they are concerned, what we are seeing is that, you know, there are already regulations out there by DOE that are regulating these efficiencies, and these energy conservation standards adequately account for that energy consumption of the fan within the system.

FACILITATOR BROOKMAN: Okay. Don Brundage.

MR. BRUNDAGE: I would agree with AHRI that you should not be regulating a subproduct of a covered product. And I am reminded of some ways this was handled in some of the lighting products where there were requirements on how things were packaged and sold to differentiate retrofit products from other products. And I think some similar sort of solutions could be done here for things that are supplied as a component to other products.

FACILITATOR BROOKMAN: Andrew, a follow on.

MR. deLASKI: So I'm trying to find a reference in the framework, but I think DOE has already said not covering fans that are part of covered products. Am I right? They're out of the scope of the rule.

FACILITATOR BROOKMAN: I saw

Aniruddh and Dave. Go ahead.

MR. deLASKI: If I could finish --

FACILITATOR BROOKMAN: Oh. I'm sorry, Andrew.

MR. deLASKI: So I think Gary's question, I would hope people could still respond to that, because to me in the Department currently we have standards to cover components for lots of things -- ballasts, light bulbs, furnace fans have a separate regulation.

So there are -- it's not an unusual thing to have a standard that applies to a component. So I think the question here -- and the challenge for the Department, as I see it, is that the Department regulates manufacturers. They don't regulate people who design systems onsite. It's not a Building Code we're talking about. We had that conversation earlier.

So the opportunity in this kind of docket is to address the fan as defined through this process. And that may be defined more broadly or more narrowly; that's part of what we are going to be discussing later I think. But I'm going to respond to Gary's question about how does that -- how does regulating the fan as an individual product impede getting to better efficiency in some overall system in the field.

FACILITATOR BROOKMAN: Let's let -- Gary, you follow on, and then I'm going to go to Aniruddh, and then I'm going to go to Karim.

MR. FERNSTROM: Okay. So I have a quick comment. Let's carry this to the extreme. We regulate buildings and new construction. So why regulate any component that goes into buildings? Why do we even have an appliance standards program?

PARTICIPANT: Good question.

(Laughter.)

MR. FERNSTROM: I mean, if you carry that --

FACILITATOR BROOKMAN: But, of course, we could have a lengthy discussion about codes, which would not be germane here.

Aniruddh.

MR. ROY: Aniruddh Roy, AHRI. My answer was just in response to Gary's initial question. And, again, AHRI is of the opinion that if you -- you know, if there are separate regulations for each component, what you are eventually doing, especially for covered equipment, you are eventually stifling innovation for the manufacturer, because now you are telling the manufacturer that you can only use this kind of a component in the system.

And there are already existing energy conservation standards out there. So as long as the manufacturer meets those standards, it shouldn't matter what the manufacturer puts into the system.

FACILITATOR BROOKMAN: Okay. Karim.

MR. AMRANE: Yes. Karim Amrane with AHRI. I would go a little bit further than that. Yes, I think it is clearly stated in the framework document that the regulation we are talking today does not apply to fans used in covered equipment. And that's fine.

But let's say we take the example of rooftop units. Okay? They are regulated by DOE, but they are regulated, let's say, up to 63 ton. Now you are talking about, let's say, 64-ton unit, which is not regulated by DOE because that's where the regulation stops.

Now, that equipment now its stand would be regulated by this -- the code that we are talking today. And that does not make sense at all.

So for us as AHRI, we would like to exclude those products from this rulemaking totally, because those are system design, they are manufactured, and there are actually standards in place, although they are not maybe standards that DOE regulates today, but they are standards in ASHRAE 90.1. ASHRAE 90.1 covers products below 63 tons, for example.

FACILITATOR BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. And, you know, I appreciate the information. And just as a follow on, think about it, if fans used for comfort heating and cooling were not excluded, then DOE would be making a standard for furnace fans. And I think a furnace fan is a blower fan. So under this rulemaking you would be making another standard for that blower fan; that could be a furnace fan.

So if you say they should not be exempt, then guess what? You're dealing with two regulations for the same product.

MR. ROGERS: Furnace fans are residential as defined now, right?

MR. ROSENSTOCK: I know. But, again, I understand --

MR. ROGERS: Not part of this, but --

MR. ROSENSTOCK: -- but for multi-family there could be issues in terms of multi-family. And for the larger ones, it could be quote "commercial sized."

FACILITATOR BROOKMAN: Okay. Dave.

MR. WINNINGHAM: And I recognize the intent here is to raise the energy efficiency of the products and it is something that we are all interested in. But just to the discussion we are having, a furnace, the component, the blower inside of that could have a commercial or industrial application.

So you could have the regulation on the component itself, a furnace fan regulation, and then also the regulation of the final furnace product. All of these things enter into and add cost at some point.

And we have to focus, what makes the most, you know, sense for the end product? A furnace -- and I'm just picking that as an example -- you can -- there are a variety of choices to increase the efficiency of a furnace. Some of them may involve very high internal static to improve the efficiency of the primary fuel source -- gas, for instance, or electricity.

So there are compromises that are made in the design of the end product to get to the efficiency level that you are trying to seek. When you take the regulation to a component level, you could have unintended consequences by requiring efficiency levels of that component. They are applied very poorly, and the ultimate result is lower efficiency, not improved efficiency.

FACILITATOR BROOKMAN: Right. So I think we're understanding, and I think we've now developed the logic here sufficiently. Okay? And so I'm eager to move on, Gary.

MR. FERNSTROM: I just wanted to say thank you. I understand that argument.

(Laughter.)

FACILITATOR BROOKMAN: Yes. Let's start on definitions. These guys have developed some great -- and noting, just one caution here, in my experience definitions are always tough and take some time and scrutiny. So we are not going to get that level of it here today.

So what you have developed will be in your written comments, of course. Let's just get a flavor for it right now, and let's start at the top and work our way down in Slide 21. Charles, so please -- Tim.

MR. KUSKI: Tim Kuski representing AMCA. And the very first question here, 2-1, is a little bit truncated. If you read the entire question in the framework, it talks about our fans sold with motors or without VFDs.

FACILITATOR BROOKMAN: Okay.

MR. KUSKI: And I'd like to address that. The fan manufacturers sell the majority of our fans with motors, and most of them are belt-driven. However, many of our OEM customers that buy our fans and integrate them into our products, they buy our fans less motors.

Packaging fans with VFDs is not common for the fan manufacturers. We don't have a number yet, but we estimate it less than five percent of the time, much less, are we selling a VFD with a fan.

And to follow up on what you and Michael were talking about, AMCA can supply DOE with more data regarding these kind of shipments, something we would have to do in a separate survey to our customers, and DRI is talking about timeframes.

So even by the May 2nd written comment period, we could get back on that.

FACILITATOR BROOKMAN: Okay. Great. Are you also in a position -- anybody at AMCA -- to address Items 2.2-2, 2-3, 2-4, especially definitions, cross-flow, blower, and safety fans.

MR. HARTLEIN: So Dan Hartlein from Twin City Fan speaking on behalf of AMCA. We believe that cross-flow fans should be exempt. We are going to get into the details and the rationale for that position as we go along today.

On the --

FACILITATOR BROOKMAN: And as a consequence, you don't want to define it?

MR. HARTLEIN: At this point, we don't. But we --

FACILITATOR BROOKMAN: Okay.

MR. HARTLEIN: -- I mean, we can define the physical characteristics, obviously, of what a cross-flow fan is. But we believe they should be exempt, and, as I said, we'll get into that.

FACILITATOR BROOKMAN: Okay. Keep going.

MR. HARTLEIN: On 2.3, the recommended suggestion/definition for blowers, they are trying to draw a line between blowers and fans. AMCA does not really recognize a difference. We use the two terms interchangeably, and we would suggest that the DOE do the same. Okay?

FACILITATOR BROOKMAN: Okay.

MR. HARTLEIN: On the 2.4, a comment on the suggested definitions for safety fans. One addition to that definition is reversible fans. There is a class of fans for tunnel ventilation, which operate in a reversible manner which has a compromise to efficiency that are there for safety.

And we also would like to insert that there are fans that are dual purpose that are designed predominantly for their safety role. So we need to keep that in mind as well.

FACILITATOR BROOKMAN: Does AMCA -- maybe AMCA -- this would be a new question for you. And, of course, practically speaking, if there are a hundred definitions, that's very cumbersome. Right? So the more definitions the more difficult it is to do everything.

But what about Steve Rosenstock's suggestion that safety fans be more differentiated? Is that something that you all could generally support?

MR. HARTLEIN: Yes. I think as we come together, we can support some discussions in that arena.

FACILITATOR BROOKMAN: Okay.

MR. CYMBALSKY: This is John Cymbalsky, DOE. Is there a certification process that you go through that is different for safety fans, for these tunnel fans, for example? Do they get certified to a different --

MR. HARTLEIN: They do. They actually get tested on almost a per-contract basis. So they are developed and tested per contract, because of the life safety requirements. And quite often they are actually tested at full temperature in order to demonstrate that they perform at those temperatures.

FACILITATOR BROOKMAN: Okay. So there is potentially some line out there in the industry that we can look at to --

MR. HARTLEIN: Yes.

FACILITATOR BROOKMAN: Okay.

MR. HARTLEIN: Those are -- it's NFPA 30.

FACILITATOR BROOKMAN: Got it. Is that an efficiency-type measure?

MR. HARTLEIN: There is an efficiency -- no, it's not. It's actually the performance of temperature and the requirements for the reversibility.

MR. LLENZA: Safety.

MR. HARTLEIN: It's a safety -- but it's not possible to design that fan at a high -- at the highest efficiency, because of the implications that come from the design for temperature.

FACILITATOR BROOKMAN: Okay. So I'm kind of a nut about structure. You'll have to pardon me. So I want you to look at page 21 in your PowerPoint slides, everyone, if you would, please. And we'd like to receive comment on your -- on these definitions, whether you like them, how you might revise them, et cetera. And noting what has also already been said, I appreciate that. I do, Mark. Or Dan. Pardon me, Dan.

MR. CYMBALSKY: John Cymbalsky, DOE. And so for the fans that you would want exempt, it would be good to provide a written comment as to how the Department could distinguish those that would be safety-related. So they go to this different safety rating, whereas other fans that aren't safety-related don't certify to that specification. So that would help us, you know, delineate one from the other.

FACILITATOR BROOKMAN: Okay. So do we have comments on commercial and industrial fan manufacturer, axial fan, centrifugal cross-flow and mixed flow, et cetera.

Or maybe -- Michael, go ahead.

MR. IVANOVICH: AMCA has been working on a fan definition, a different definition of fan. And we are pretty far along, and we are going to provide a more detailed definition of a fan in our written comments. But it's too long. You know, it's got a lot of parts to it, because we are understanding that it has to be statutorily enforceable. And so we are very, very precise with this definition --

FACILITATOR BROOKMAN: Gotcha.

MR. IVANOVICH: -- and we're going to provide it in written comment.

FACILITATOR BROOKMAN: Okay. Excellent. Excellent. Additional and perhaps final comments on this segment, authority definitions and regulatory options? Because we're about to go to break.

Andrew?

MR. deLASKI: I just want to come back to the issue we were talking about a few moments ago. So on -- you know, it's on page 2, that DOE says it's not considering fans that are components in regulated commercial products in this rulemaking, and I'm wondering why. Is there a legal reason why, or is it simply a determination that -- for the reasons that we have already heard, is there a tactical reason why?

FACILITATOR BROOKMAN: Betsy.

MS. KOHL: So I can address at some level the legal issue that we have been discussing. And, obviously, it is open for comment. We want to make sure that there aren't duplicative standards. As you know, there are requirements for updating standards for certain products, right, and timelines, that sort of thing.

And then there is also -- and this is components of consumer products, but it's in the definition of industrial equipment. So we want to make sure that we stay clear of that one, too. It's 6311(2)(A)(iii). So if you want to go take a look at that.

So there are some legal issues that we have been discussing. But if you have input or comments that you would like to make, they are of course welcome at this early stage.

MR. deLASKI: Okay. Thank you.

FACILITATOR BROOKMAN: Okay. Who else -- so, yes, please. Is it Mark?

MR. BUBLITZ: Mark Bublitz, New York Blower Company on behalf of AMCA. I would like to just recognize in Item 2.7 that the definitions are tightly coupled with fan classifications, and AMCA would request that DOE consider a more granular approach, which we are prepared to share when we get to Section 5.

FACILITATOR BROOKMAN: Okay. Okay, good. And Charles Kim joining us online, Charles, you are next. Please speak clearly and loudly.

MR. KIM: Okay. There are

industrial blowers within the ratio of greater than 1.2. So, therefore, I am wondering if it would be a gap between the definition of blower away from the compressors.

So right now my understanding is that U.S. DOE doesn't have any rulemaking or framework for our compressors. And it depends on how you define the specific ratio. Some blowers might not be defined by the fan or the compressor later on.

FACILITATOR BROOKMAN: John Cymbalsky.

MR. CYMBALSKY: Yes. So DOE does have a coverage determination out in the public view on compressors. So that will be handled under a separate rulemaking.

FACILITATOR BROOKMAN: Charles? Okay?

MR. KIM: So anything greater than 1.2, specific ratio greater than 1.2, will be covered by compressor.

MR. CYMBALSKY: I don't have the

numbers on the top of my head, but we'll get back to you on that one.

MR. KIM: My concern was -- yes. My concern was DOE should not have any gap. Some of the blowers is operating in specific ratio greater than 1.2. So if there is a blower that is not covered by a fan or the compressor later on, then it will be a lost child.

MR. CYMBALSKY: John Cymbalsky, DOE. Yes. We normally try to avoid creating loopholes and that kind of thing.

FACILITATOR BROOKMAN: Charles, and everyone participating, I think we have said this already today, but the Department really appreciates your detailed comments in writing. And then these issues, they all get addressed, so please do that.

Charles, what is your affiliation?

MR. KIM: Charles Kim from Southern Cal Edison Company. I have a plan to file written comments with the other utilities within California.

FACILITATOR BROOKMAN: Charles, would you say it again? Because at the front of that you were breaking up.

MR. KIM: Charles Kim from Southern California Edison Company.

FACILITATOR BROOKMAN: Thank you. Thank you. Okay, Charles. Thank you.

MR. KIM:

FACILITATOR BROOKMAN: Okay. Let's take a break. It's almost 10:30. We will take a break until 10:45. You must wear this badge visible while you're in the building.

And there is a coffee shop on the ground floor. The restrooms are at both ends of this hall, both men's and women's restrooms at both ends of the hall.

And we have a good start on it, and we need to try and keep being specific as we go along.

(Whereupon, the proceedings in the foregoing matter went off the record at 10:27

a.m. and went back on the record at 10:50 a.m.)

FACILITATOR BROOKMAN: Okay. And at the break, Michael approached me and said he would like -- they would like to return to definitions briefly, so let's do that before we turn to Sanaee.

Michael, please. Or --

MR. STEVENS: Hi. This is Mark Stevens. I'm with AMCA.

FACILITATOR BROOKMAN: Yes.

MR. STEVENS: And under Definitions, we just wanted to point out that our trade association has a little bit more restrictive definition of fan, and that we consider a fan a device that converts mechanical power to air power.

FACILITATOR BROOKMAN: Okay. Well, definitions are important, and you all should --

MR. STEVENS: We will be submitting --

FACILITATOR BROOKMAN: -- meet the deadline for submittals, but --

MR. STEVENS: Right.

FACILITATOR BROOKMAN: -- give it your due diligence.

MR. STEVENS: We definitely will.

FACILITATOR BROOKMAN: Yes. Okay. Thank you.

So now we are turning to Sanaee, regulatory regimes. And we are on Slide 27.

MS. IYAMA: Okay. So I'm Sanaee Iyama with the Lawrence Berkeley National Lab, and I will start with the regulatory regimes.

So as Charlie mentioned before, there is no statutory definition for commercial or industrial fans. And DOE may consider a definition that includes the motor drive and/or a VSD. This approach, for example, is used in Europe in their non-residential fan regulation or their regulating fan inclusive of motors and controls.

MR. ROSENSTOCK: Question.

FACILITATOR BROOKMAN: Steve, please.

MR. ROSENSTOCK: Hi. Steve Rosenstock, EEI. On Slide 21 there was another proposed definition. So my question is, which definition is going to -- are you looking at?

MS. IYAMA: Right. So here -- this definition is for fans defined as bare shaft fans. And in this next section we are discussing a potential definition that would include motor drive and controls.

FACILITATOR BROOKMAN: You're referring to the definition on page 27. Say it again, what that is?

MS. IYAMA: So it's a definition of commercial and industrial fans.

FACILITATOR BROOKMAN: On 27.

MS. IYAMA: On Slide 27 that would include motor drive and/or the VSD. Again, there is no statutory definition for commercial and industrial fans, and this is a discussion of a possible definition that would be inclusive of those components.

FACILITATOR BROOKMAN: Okay. Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Thank you again. It's a more expansive definition, and my concern -- and I expressed it yesterday, I'll express it again -- I am a little worried that it is just -- you know, there might be other technologies that might be manufactured with a fan other than variable speed drives.

And there is other technologies that can help improve the efficiency of a fan other than variable speed drive. So I would be very worried about for this definition just saying VSD. In my mind, it should be a more expansive or inclusive type of wording, such as energy -- fan energy control system or device or energy management device rather than just a VSD.

Again, I know it is getting in the

weeds, but I think it could be -- it can be pretty important because of the fact that I don't think that technologies or options should be limited, and this is kind of a -- it kind of limits it. It's a great technology, but it does limit it.

FACILITATOR BROOKMAN: You're going to send these in in your comments, right, Steve?

Charles Llenza.

MR. LLENZA: Yes. I'd just encourage everybody to send your comments in with that respect. And, again, this is the framework document, so this is a proposal, and we make adjustments according to our comments.

FACILITATOR BROOKMAN: And definitions are always tough. There's just no doubt about it.

Rob, go ahead.

MR. BOTELER: Yes. I would just comment, you know, in the motor world, we like the term variable speed or adjustable speed.

We don't like the term variable frequency drive, because then that limits us to induction motors. But when we say variable speed, we really include electric, electronic, or as well as mechanical adjustable speed.

FACILITATOR BROOKMAN: Okay. Thank you.

Sanaee, keep going.

MS. IYAMA: Thank you. So those variable speed devices are controls that allow matching the rotational speed of the fan to match process requirement. And they benefit variable load applications. They may not appropriate for all types of application, and DOE is aware that some fans could be used in both constant and variable load applications.

DOE is also aware that manufacturers cannot control if and how a VSD is used. And in their -- in our analysis we plan to conduct the analysis across the full spectrum of fan applications and characterize baseline conditions to establish the impacts of using VSDs on the field energy use.

Depending on the fan definition, DOE is considering three regulatory regimes. If a fan is defined as a bare shaft fan, DOE is considering a bare shaft fan regulatory approach for all fan types, regardless of how they are sold. And that is regulatory regime number one.

If fans are defined as inclusive of VSD if sold together, then we would have two sets of equipment classes -- fans without VSDs and fans with VSDs. And that's regulatory regime number two.

If fans are defined as inclusive of a motor if sold together, then we would have, again, two sets of equipment classes, this time fans sold without motor, fans with motors. And that would be regulatory regime number three.

And in the next section related to metrics, we will see how this impacts the process.

Here we have a comment box related to the regulatory regimes. Item 2-9, do you request comments on whether establishing standards for fan defined inclusive of the motor, transmission, and controls could increase the benefits of using VSDs in the field?

2-10, DOE requests data and comment on whether fans are most often combined with motors, VSDs, or both, by the fan manufacturer or by fan distributors/contractors.

2-11, DOE requests information on how often and in what circumstances the intended application is known when the fan is sold.

And 2-12, DOE seeks comments on whether to consider establishing standards only for fans with fan diameters below a certain maximum or above a certain minimum. So that comment actually relates to the sections we covered before --

FACILITATOR BROOKMAN: Okay.

MS. IYAMA: -- on the definitions.

FACILITATOR BROOKMAN: Let's start with the first one, 2-9. Mark.

MR. STEVENS: Yes. We have, you know, some comments we could make immediately on some of these definitions.

FACILITATOR BROOKMAN: Please.

MR. STEVENS: The first one is on VSDs. The first definition on page 8 refers to a VSD as a device that can control the speed of a motor or a fan, and then on page 15 it is more restrictive, saying that a control using -- controlling the speed of a fan or a motor using voltage control. And we prefer the less restrictive definition, the one found on page 8.

FACILITATOR BROOKMAN: Okay.

MR. STEVENS: All right. The second one has to do with the definition of a bare shaft fan. Bare shaft fan, that definition is a European construct, something that is really not used here. We use the term driven or non-driven fans.

FACILITATOR BROOKMAN: Michael.

MR. IVANOVICH: This is Michael Ivanovich, AMCA International. It is kind of a question, really, you know, when we started this rulemaking process we had heard this idea floating about, the extended product approach from Europe being applied in the United States.

And there was a question early on whether or not DOE had the authority to develop a regulation for extended products. And AMCA would like to hear some explanation as to how that was resolved.

MS. KOHL: This is Betsy Kohl, DOE OGC. We are still considering that issue. So if you have, again, input and analysis, we'd appreciate it.

FACILITATOR BROOKMAN: So, Louis -- oh, go ahead. Follow on, Michael. Keep going.

MR. IVANOVICH: So just to clarify,

even though the extended product approach is being proposed by DOE in the frameworks for pumps and fans, it is not completely determined whether or not you could regulate on extended --

MS. KOHL: This is --

FACILITATOR BROOKMAN: Betsy, please get close.

MS. KOHL: Sorry. Betsy Kohl, DOE GC. So this is not a proposal, right? That's the proposed rule. I know we kind of interchanged those terms. But this is an early stage framework document where we are still fleshing out all of those issues and seeking comment and input on them.

FACILITATOR BROOKMAN: Go ahead.

MR. IVANOVICH: I'm just -- since we're new to the process, it could be implied -- it seems inferred to us that they would have the authority to regulate that. That's all.

FACILITATOR BROOKMAN: Okay.

Louis.

MR. STARR: Louis Starr with Northwest Energy Efficiency Alliance. So Item 2-9, it represents a substantial opportunity to save a lot of energy.

And so one of the questions I had maybe a little bit for AMCA was, actually, I was looking at your In Motion magazine and it just mentioned that January 1st of 2013 they put in the FMEG requirements, which essentially addresses that extended product type of view of it.

How has that affected -- I mean, it says it's eliminating 13 percent of your market of certain kind of fan. How -- I'm assuming that AMCA sells both in the American and European market. Have you seen that? How has that worked out for you? And has it been a positive or a negative experience?

(Laughter.)

FACILITATOR BROOKMAN: No comment at this time.

MR. IVANOVICH: Our official response really is that it is kind of too early to tell. I mean, it's just starting, so it's really too early to tell.

FACILITATOR BROOKMAN: Thank you, Michael.

Dan.

MR. HARTLEIN: Yes. I wanted to just add an explanation about how -- something our industry does in the variable speed, which is very different than what you see in the pump world. Our industry is dominated by shipments with belt drives. A belt drive is mechanical speed adjustment, as Rob presented it earlier.

What happens often is that once a commercial fan is in the field applied to a system, many of these drives are actually meant to be variable diameter or variable speed. So when the air balancer comes through and balances the product, he ends up setting an exact speed for the exact load and maximizes efficiency through that process.

So the concept that those results aren't being achieved through -- because we are not using variable frequency drives, really, I think we have. I think the industry has found a very, very cost effective approach to set that exact operating speed and maximize that efficiency for that installation.

FACILITATOR BROOKMAN: Okay.

MR. IVANOVICH: How does the --

FACILITATOR BROOKMAN: Oh, just a second. So I thought variable speed drives, though, were a component that was a defined entity, and that's different from having someone who is capable of servicing a motor and a belt drive and creating the optimal, right?

MR. HARTLEIN: Well, again, Dan Hartlein speaking for AMCA. That goes I guess to the definition of VSD --

FACILITATOR BROOKMAN: Okay.

MR. HARTLEIN: -- as opposed to --

FACILITATOR BROOKMAN: I'll just leave it there. Go ahead, Louis.

MR. STARR: Maybe I could clarify I think what he's getting at. What he is referring to is whether -- kind of matching your fan and your load to the -- or the fan motor operation to the load.

So it -- what I think -- the captured savings in this one is more the adjustable load profile. That is the savings you are trying to get, although there still could be some savings attained by being able to adjust that constant volume fan in the field in terms if your design changes down the road or if there are some other aspects of it. And assuming that a lot of the shift changes that you're talking about happen, so --

FACILITATOR BROOKMAN: Okay. Yes, go ahead, please. Say your name.

MR. WAGNER: Greg Wagner, Morrison Products. I want to go back to that definition of bare shaft fan and --

FACILITATOR BROOKMAN: Where is it, Greg?

MR. WAGNER: Let's see. It's Slide 21.

FACILITATOR BROOKMAN: Okay.

MR. WAGNER: And while there is a great deal of product that is sold as belt drive fans and they do come with shafts and those things, there is a great deal of product that is sold as for -- intended for direct drive use, both with and without VSDs.

How do you plan on differentiating between products that are sold as -- there is no shaft, it's a bare fan, versus ones that are sold as bare shaft? Because it is a little different in that application. Some are sold into -- where they are intended to be used with the housing, but they don't -- they are not sold with the housing, because it is part of the appliance or product that is going to be manufactured. So there is a whole other level of this.

And the final thing is the question of, what is a commercial and industrial and how are you going to differentiate that? Because a lot of products are sold into both residential, consumer-type products, as well as --

FACILITATOR BROOKMAN: And this is a framework meeting where we are just fleshing this issues out. So if you have a recommendation about how these issues get addressed, because I don't think the Department is going to take a stand on this yet. Right?

MR. WAGNER: Well, they are putting forth the framework for regulating something, and the question is, what is that something?

FACILITATOR BROOKMAN: Betsy?

MR. WAGNER: There's a wide range of products that could be covered under the scope of this, which is as broad as I can say.

MS. KOHL: So this is Betsy Kohl from DOE GC. Just to give you a little bit of your framework, the definition of industrial equipment talks about distribution for commercial uses. So that is sort of -- I mean, it's the fan that we're looking at, but, I mean, there are a couple of I guess --

MR. WAGNER: Nuances.

MS. KOHL: Yes. That we are looking at. So in order to frame your comments, it might be useful to look at that.

FACILITATOR BROOKMAN: Okay.

MR. WAGNER: Well, I guess that needs to be identified, what that is, because fans are sold into applications that are similar that go into both industrial/commercial, if you will, as well as consumer-type products. And it's the same product.

MS. KOHL: Right.

MR. WAGNER: So how are we differentiating between those? And then the other one is, what is a bare shaft?

MS. KOHL: Right. Well, on your

former issue, I think what Doug is saying and what we have been trying to say is that this is an early stage document. So your input on where things are sold and what you think should be covered would be very useful.

FACILITATOR BROOKMAN: Okay. Then, back to Sanaee.

MS. IYAMA: So there's a second comment box related to the regulatory regimes. Can I --

FACILITATOR BROOKMAN: Yes. Let's make sure we finish. I didn't think we finished with this one yet. Let's scan through this, and see if we can get additional comment on these four items.

Steve Rosenstock first.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Please forgive me if I'm going to sound like a broken record here, but I'm a little worried, especially on 2-9. It says, "Increase the benefits of using VSDs in the field." This makes it sound like you are trying to push VSDs. And as I said before, there is other technologies that could be used with these products.

And so in terms of extending -- you know, in terms of I'll say an extended product, if you're going to look at technologies that might be included with fans and motors, then it just can't be VSDs.

There might be other technologies that currently exist or will future exist, and to say that you are only going to look at VSDs is very -- number one, it's limiting you. Number two, there are competitive issues involved if a regulation increases the cost of a VSD compared to its competitors or decreases the cost compared to its competitors.

So I am -- I know it's just -- I know it might be wordsmithing or minor word, but I think if you are going to do this it has to be -- and it is going to go throughout, but it's VSD or other technologies or all other controls that can be used with these products, because otherwise it is -- I believe it is very -- it is just --

FACILITATOR BROOKMAN: We get your point.

MR. ROSENSTOCK: Okay. And the second thing is --

FACILITATOR BROOKMAN: No, we get it. And you can imagine the Department would want to put a specific issue like this in here to -- as a prompt to receive comment.

MR. ROSENSTOCK: And --

FACILITATOR BROOKMAN: John Cymbalsky.

MR. CYMBALSKY: Yes. We'd like -- as we said yesterday, I think if you -- you can actually enumerate what those other control devices are called in your comment.

MR. ROSENSTOCK: Sure.

MR. CYMBALSKY: I think yesterday you mentioned an on/off switch was one of them.

MR. ROSENSTOCK: Well, stage

controls or, you know, step function --

MR. CYMBALSKY: Yes.

MR. ROSENSTOCK: -- controls or --

MR. CYMBALSKY: Fine. Whatever they're called now and --

MR. ROSENSTOCK: Yes.

MR. CYMBALSKY: -- how they are used now. That would be great.

MR. LLENZA: This is Charles Llenza, Department of Energy. Also, we are open to changing the nomenclature a little bit, like instead of calling it a VSD, mechanical, you know, devices, control devices of sorts or just propose something. We're open -- we're subject to that.

FACILITATOR BROOKMAN: Mark.

MR. BUBLITZ: Mark Bublitz, New York Blower Company on behalf of AMCA. I'd like to address Item 2-11, how often and in what circumstances applications are understood. In terms of fan performance, we typically understand that air flow and pressure -- but that's only at one specific operating point at which the fan is sized and sold.

For industrial applications, the intended application is often known, but many times it's down the channel, sales rep or even post the sales rep. And then, for commercial applications, it is less known for fans that are sold. And the distributors, it could be rarely known. You'd probably have to contact individual manufacturers to get more detailed information, but that was the consensus of our team.

FACILITATOR BROOKMAN: Okay. Okay. Yes, please. Say your name.

MR. TROMBLEY: Dan Trombley, ACEEE, in regards to the definition of VSD. I'm wondering if there is kind of two things that we are looking at here, one being a way to sort of statically change the speed of the fan, like the belt drive that they described -- that AMCA was describing earlier, that you basically do one -- so you can do it occasionally, like to update the system.

But the other is more of an automatic control that is not -- just use of a lay term of real time. That includes some kind of variable speed drive with the sensors and controls to actually move it. So I'm wondering if there's -- that issue is explored here.

FACILITATOR BROOKMAN: Okay. Thank you. Yes.

Did you wish to comment?

MR. STEVENS: Just one comment on Number 2-12.

FACILITATOR BROOKMAN: This is Mark. Go ahead, Mark.

MR. STEVENS: Mark Stevens from AMCA. I'm sorry. That AMCA concurs with the upper limit, the 98-inch upper limit that was in the framework document.

FACILITATOR BROOKMAN: Yes.

MR. STEVENS: But we wanted to call

attention to the fact that most labs can test sizes much smaller than 98 inches. They are typically in the 38-, 39-inch, or one meter fans as their maximum.

But we don't find that to be a particular problem because we use the fan laws, the affinity laws, to calculate larger size performance from smaller size performance. And generally, because fan efficiency increases with size, it leads to conservative prediction of performance.

FACILITATOR BROOKMAN: Okay. Let's move on to the next comment box.

MS. IYAMA: Okay. So Item 2-14, DOE requests comments on covering fan plus motors with motor-powered requirements between 125 watt and 500 kilowatts for this rulemaking.

DOE requests comments on what percentage of fan motors are covered by the small and medium electric motor standards. DOE seeks comment on the market share by fan type and applications of fans that are driven by equipment other than electric motors.

DOE requests comments on fan transmission types, and DOE requests comments on the VSD sold with fans and whether there is efficiency variability amongst VSDs.

FACILITATOR BROOKMAN: Let's start at the top. Mark.

MR. STEVENS: Mark Stevens again from AMCA. We have a question on Item 2-14. It looks like this is a reference to EC 327. But the framework document wasn't clear as to what power was being referenced. 327 talks about motor input power, but the framework document wasn't clear as to what power was being referred to. Is this shaft power or name plate power or motor input power?

MS. IYAMA: I believe it's the motor name plate power.

MR. STEVENS: Motor name plate power? So it's different from 327.

MS. IYAMA: I need to doublecheck

on this. I'm sorry. Unless --

FACILITATOR BROOKMAN: We'll have to check on that.

MR. STEVENS: Okay.

FACILITATOR BROOKMAN: Okay. Steve Rosenstock.

MR. ROSENSTOCK: Thank you for that clarification. Steve Rosenstock, EEI. If it's motor input power, then you're really talking about -- with those type of power usages, you're basically talking about motors that are about one-eighth horsepower up to about one-half horsepower. It might be, you know, in that range.

So, really, you are -- kW, I'm sorry, it's one-eighth horsepower up to about 750 -- probably about 750 horsepower then. So that's quite the range, and in fact it is higher than the -- well, motors only go up to 500 horse -- yes, that's quite the range. Yes. But you're talking as low as one-eighth of a horsepower.

So, again, there is an issue there. And that could be in a whole bunch of, I'll say, residential/consumer products. So, again, that is -- using that, it's obviously a very huge scope that, you know, again, it's a matter of -- in terms of energy usage, especially going after the really small ones, I don't know if it's really -- for first rulemaking if you really wanted to go that low.

Thank you.

FACILITATOR BROOKMAN: So I'm looking -- Sanaee, I'm looking at 2-14. What were you hoping to get by way of comment with this question? I'm not quite clear myself.

MS. IYAMA: I think this is also referencing to the European regulation, because they have those limits on the motors that are within their fan regulation.

FACILITATOR BROOKMAN: Okay.

MS. IYAMA: And so it's just to request feedback on what stakeholders here have to say about these criterias that --

FACILITATOR BROOKMAN: Okay.

MS. IYAMA: -- Europe is using.

FACILITATOR BROOKMAN: So I don't think we've received any comment on this yet. What about this range, any comments on that?

Michael?

MR. IVANOVICH: Michael Ivanovich, AMCA International. AMCA advocates that the lower range be greater than five horsepower to be consistent with 90.1 2013, and our IECC proposal for IECC 2015. This lower range would accommodate what we consider to be a reasonable Phase 1 approach to regulating fans, as Steve Rosenstock pointed out. Great segue, Steve.

That this net being cast by the framework document is huge, and we think that this is -- it would be a tremendous burden on small businesses, you know, that compromise 80 percent of our membership.

FACILITATOR BROOKMAN: So not

covered below five horsepower.

MR. IVANOVICH: That's right.

FACILITATOR BROOKMAN: Okay. Gary.

MR. IVANOVICH: Five horsepower -- excuse me. Not covered five horsepower and below.

FACILITATOR BROOKMAN: Right, right.

MR. FERNSTROM: So Gary Fernstrom for the California utilities. We support DOE's recommended range in the framework from 125 watts to 500 kW, because although there may be relatively less savings with the smaller size equipment, there is pervasively a lot more of it.

And we shouldn't forego the opportunity to look at cost effective energy efficiency improvement across the broad range of product in the market, particularly those smaller units that are utilized by small businesses where the cost of their operation is reflected in their utility bills.

FACILITATOR BROOKMAN: Okay. Louis.

MR. STARR: One of the things, I think the thought process is kind of getting those -- the European Union and the American standard to kind of match up in terms of having to produce to more than one market.

But perhaps another thought might be is kind of limiting it to three-phased motors, and that would be probably in the half to one horsepower range as a bottom limit, and then go on up to -- some are higher limit. That makes sense.

FACILITATOR BROOKMAN: Okay. Thank you.

Dan?

MR. HARTLEIN: Yes. I'm going to take on 2-16, if we're ready to move on.

FACILITATOR BROOKMAN: Okay. Yes.

MR. HARTLEIN: So on 2-16, AMCA does not have that data, so we are not in a position to present that at this time.

On 2-17, I'm just going to go through a few of these in order --

FACILITATOR BROOKMAN: Please do.

MR. HARTLEIN: -- if that's okay.

FACILITATOR BROOKMAN: That's good.

MR. HARTLEIN: On 2-17, we believe that -- in the commercial business that the fans are always driven by an electric motor. However, the industrial business within these categories are some fans that can become steam turbine-driven, and we have seen some combustion engine drives as well in this range.

On 2-18, DOE requests comment on transmission types to be considered in the rulemaking, and we believe that the transmission types that have been defined are adequate.

And on 2-19, DOE requests comment on the types of VSD sold with fans and whether there is efficiency variability, and AMCA would just like to reiterate that we really don't have the expertise in this area, because more often than not we are not selling the variable speed drive or the variable frequency drive in this case. So it's outside of our realm.

FACILITATOR BROOKMAN: Okay.

MR. HARTLEIN: Okay?

FACILITATOR BROOKMAN: Thank you. That was systematic.

Andrew.

MR. deLASKI: Just a follow up to Michael on the first question there on the range.

FACILITATOR BROOKMAN: Andrew, I'm sorry. You need to get closer.

MR. deLASKI: I understand that the existing definitions used in ASHRAE cover five horsepower and greater.

MR. IVANOVICH: Over five horsepower.

MR. deLASKI: Over five horsepower, so greater than five horsepower.

MR. IVANOVICH: Yes.

MR. deLASKI: Great. Thanks for that clarification. You know, to me this is a data question, and the data question is, you know, what are the -- in terms of the total horsepower sold to the marketplace, so what -- how much horsepower is being sold that's under five horsepower?

And what is the opportunity to improve efficiency in that -- those products? So it really comes down to a data question. I think one of my colleagues said that there is an ASHRAE paper suggesting maybe a third of horsepower.

So my understanding is that there is a lot of horsepower going out there. I don't know what the opportunity is there, but it strikes me as more than a de minimis portion of the market. Is that a fair characterization?

MR. IVANOVICH: Well, a couple of points on that. One of them is that our rough estimates based on the data that are available from our members today, we estimate that keeping it above five horsepower will still address 73 percent of the connected horsepower load in energy usage.

However, just to bring out, you know, we're not going to fight -- or, you know, we're going to concede the upper range on the limit, so there is a lot of opportunity on the upper range. And we also think that although that energy savings may be out there, we are advocating a more phased approach to addressing it.

I mean, again, going after that large of a scope on your first round would be very difficult.

FACILITATOR BROOKMAN: So say a little more about the phased approach. How would you see that?

MR. IVANOVICH: Well, it's just like you didn't regulate motors all at once. You didn't regulate every type and every size of motor. The way that this framework is scoping out it looks like you are regulating every type of fan, almost every size, using commercial and industrial buildings.

FACILITATOR BROOKMAN: Charles Llenza. Coming back to you, Gary.

MR. LLENZA: Yes. This doesn't limit us from separating those smaller motors and just doing a different level of standard for those motors. So -- I mean, for those fans, so --

MR. IVANOVICH: That's true, but we are also talking about businesses that would have to be compliant with those regulations right off the bat. So --

MR. LLENZA: Wow.

MR. IVANOVICH: -- the regulatory burden is still there, even though they might not have to redesign it.

MR. LLENZA: Yes.

MR. IVANOVICH: But we're talking six years out, so --

FACILITATOR BROOKMAN: Gary Fernstrom.

MR. FERNSTROM: I'm puzzled why we are concerned about limiting the energy saving opportunity in deference to their regulatory burden to some segment of the market. There is a recognized regulatory burden with any of these standards.

And if we are going to take the opportunity to invoke them for the environmental benefit, and other benefits they bring, we should address the greatest opportunity possible when we do these rulemakings, not exclude some significant, potentially, as Andrew noted, portion of the savings just because we don't want to regulate everything at once.

FACILITATOR BROOKMAN: Andrew.

MR. deLASKI: I mean, to me -- well, I'll just come back to my first comment, a data question. And, Michael, thank you for the data point on the 73 percent or -- in the scope that you are suggesting, right. And that's the kind of data that we are going to be looking for to kind of understand where the opportunity lies.

So then the other piece of that question is -- the other piece of that question that is going to be data-driven is what is the savings opportunity within each of these places, right?

So in general, again, very broad generalities, we tend to think that in larger equipment the market does a better job of driving efficiency, because there is more savings there than it does in smaller equipment. And in smaller equipment, in general, we tend to find that the barriers to efficiency are more pervasive.

So, because the savings may actually be small for an individual consumer but large for society. So we're hesitant to sort of say here at the beginning, under five horsepower let's just cut it out. I hear you.

I understand that there is -- that has impacts for small manufacturers that we have to take into consideration.

But I'm hesitant to say here already we know that's not where a big chunk of the savings opportunity is that we should be considering. So, and again, to me it's all about the data.

FACILITATOR BROOKMAN: Yes. Rob.

MR. BOTELER: Yes. The motor rules referenced a few times, and, you know, in the motor rule we did -- we started out with general purpose product and we started out with one to 200 horsepower.

And one of the things that it did is it allowed our engineers to go through and, you know, there's a perception that we as manufacturers have endless resources of design and manufacturing and a lot of capability.

And working for a multi-billion dollar a year company, when you sort it down to the size of the division, we really don't have a huge amount of resources. And it allowed us to focus our resources on the core products, the low hanging fruit, and at the same time I think it gave our engineers an opportunity to explore new energy options with the general purpose product that when we were ready to then move into the EISA regulations and expand to other products and increase the efficiency we would gain some knowledge along the way, and it was -- it really benefitted the whole process.

FACILITATOR BROOKMAN: Okay. Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. About 2-16, about percentage of fan owners covered by the small and medium electric motor standards, I know that small motor standards take effect in I think March of 2015. I'll say that goes from about --

PARTICIPANT: (Off-microphone comment.)

MR. ROSENSTOCK: Okay. Thank you.

Sorry. He has that date written on his calendar, I bet.

I'm just -- this is -- it's a question in terms of once this date -- and, again, in terms of Andrew, in terms of data, suppose the answer is two-thirds, three-quarters, 90 percent, 100 percent. What is DOE's response? What is DOE -- is DOE still going to have -- look at regulating those motors under this rulemaking?

FACILITATOR BROOKMAN: Thank you, Andrew.

All right, Steve. Who else did I -- did I see somebody else over here? No. Yes, please. I thought so. Please state your name for the record.

MR. SMITH: I'm Wade Smith from AMCA. I just want to read into the record also the smaller sized equipment that use the smaller motors, today those products are manufactured at -- with higher levels of tooling, and, thus, enhancing their performance requires a larger investment relative to the return.

And the smaller products are also supported by many very small companies who are members of our association, whose resources and availability of resources to deal with this rulemaking are less than our larger companies.

I'll just reiterate, 97 percent of our members have annual sales of less than $50 million, and 80 percent of our members have sales of less than $10 million a year. So this is a -- our choice of the five horsepower limit is driven by the realization that it is a segment of the connected load which requires much more investment for much less return, and which is much more impactful on small businesses.

Thus, we felt that this rulemaking should focus on the larger size units and allow the smaller units to come along at a later time.

Thank you.

FACILITATOR BROOKMAN: Thank you. That was helpful. Meg, did you --

MS. WALTNER: I have a follow-up question for you, Wade, actually. What percentage would you say of the under-five horsepower -- your members that sell into the under-five horsepower market also sell into European market? What is the crossover like there?

MR. SMITH: It's a very small number. I should add that fan products tend not to ship across continents. Designs are exported, and product is manufactured. In other words, the same product will be manufactured on more than one continent, but it is very, very seldom that a product might be made in the United States and shipped to Europe, or vice versa.

MS. WALTNER: But is it the same manufacturers selling into that under-five horsepower market in both places or --

MR. SMITH: Not of the small businesses.

MS. WALTNER: Okay.

MR. SMITH: There are some large member companies who work on more than one continent, some of whom work worldwide, yes.

MS. WALTNER: Okay. Thank you.

MR. deLASKI: Wait. Don't go away.

(Laughter.)

Another followup question. You know, this is -- the scope issue is one that, you know, we want to be able to -- be able to understand here. The thing I want to understand is you said two points about the smaller fans -- one, that investing in them requires -- is a higher level of tooling than what -- and so more of --

FACILITATOR BROOKMAN: Talk to the mic, Andrew.

MR. deLASKI: I'm trying to talk to Wade, too.

FACILITATOR BROOKMAN: Yes. I

know. I know.

MR. deLASKI: He's behind me, for those who are --

FACILITATOR BROOKMAN: He'll accept it. Go ahead.

MR. deLASKI: That more automation is -- it's a more automated process than manufacturing. Is that what I'm hearing?

MR. SMITH: Yes.

MR. deLASKI: But then also that there is a small manufacturer. So those things sort of seem to be in conflict, that those -- so are small manufacturers highly automated, or is it that the small guys are also trying to play against folks who are bigger but highly automated?

MR. SMITH: Yes.

(Laughter.)

MR. deLASKI: The big guys are there, too, and that's --

MR. SMITH: Yes. I mean, you know, in our internal discussions, you know, we have small companies at the table, some of whom are making product with tooling that was created in the 1950s and 1960s, and this is a small family-owned business that has developed these tools out of oak, for example, that, you know, they still use today and to take 50 years of tool and die making for this small company and say, "Now, in five years, you have to change it all."

They will just button the -- they will just close their doors. That's the only thing they can do, really.

MR. deLASKI: Right. No, I get the point. And do you have a feel for -- or does AMCA have any feel for what portion of that market is served by the small manufacturers who are -- I wouldn't say making it out of oak but using oak equipment, but those small manufacturers who are in that category versus the larger players who are --

MR. SMITH: Well, I would say this, that since 97 percent of our members are much smaller than the Federal Government definition of a small business, it is hard to imagine that we would -- I mean, first of all, I don't know the answer to the question.

MR. deLASKI: Okay.

MR. SMITH: So it would require some research. But take on faith that there is an awful lot of market share and impact on these small manufacturers in this size range.

MR. deLASKI: Great. Thanks for that explanation.

FACILITATOR BROOKMAN: We have a follow-on. Go ahead.

MR. WAGNER: Greg Wagner. As an employee of a small manufacturer of fans, I understand the issues that Wade talked about. We do have highly automated processes, and it is very expensive to change them. But we are a small company. We don't have the resources that I see employed around here today to put this rulemaking in place.

We make fans that go into both

residential as well as commercial and industrial applications. The question is going to be, how do you differentiate between them? How do you manage that process? We need to get an understanding of what that is in order to be able to understand what we are going to have to do to be able to comply with that.

One of the questions that wasn't asked is, what percentage of those fans under that five horsepower are already covered product? Karim and the AHRI folks maintain that a great deal -- a large number of those are already covered products under other regulation.

And this increasing burden of extra regulation is a challenge for a small manufacturer like us.

FACILITATOR BROOKMAN: Okay. Gary.

MR. FERNSTROM: Gary Fernstrom. In this framework meeting, I think this issue has been well framed. I would say rather than speak anecdotally about it and dismiss this opportunity arbitrarily we ought to include it in the rulemaking and study it, so that we can have an objective, factual, on-the-record understanding of what the costs and opportunities are, and then a good decision can be made about what to do with it.

FACILITATOR BROOKMAN: Sounds good. I'm glad we've raised it. You're next.

MR. GOTHAM: Aaron Gotham with Greenheck Fan. And we are one of the larger manufacturers in the industry. So a couple of questions to follow up on the question about Europe. I would say there is almost no crossover between U.S. and European selling of --

FACILITATOR BROOKMAN: We can't hear you, so just get -- yes, thank you.

MR. GOTHAM: Okay.

FACILITATOR BROOKMAN: I think it's on.

MR. GOTHAM: Okay. Within our

industry. So we do very little selling, almost none in Europe, actually, and we are one of the larger players. So there -- unlike the pump manufacturers, it seems like there's a lot of EU and U.S. kind of commonality, very different in the fan industry. It really is different continents, very different worlds, for most of our products.

The second thing just talking about the small businesses, I do think -- and, again, we are one of the larger ones. I think it would put the small businesses at a competitive disadvantage. I think that we do have the resources to react faster than the small guys, and I do think that, speaking on behalf of small guys, that would really be problematic for them.

FACILITATOR BROOKMAN: Okay. Thank you. I think it would be good for us to keep going. We answered all the questions here in this comment box. Any other contributions before we move on?

(No response.)

Okay. Sanaee.

MS. IYAMA: Okay. So next I will go over the test procedure and efficiency metrics section.

So when DOE establishes a standard, manufacturers must use a DOE test procedure to ensure compliance with that standard, and to make the representation of the energy use of their product.

And as was mentioned earlier, DOE is developing a test procedure for commercial and industrial fans, and the first step in that process is to review existing industry test procedures.

Current industry test procedures include the AMCA 210, AMCA 220, and the ISO 5801 test procedures. AMCA 210 is applicable to all fan types and is widely recognized and used in the U.S. AMCA 220 includes specifications for air curtain testing, and ISO 5801 is an international standard similar to AMCA 210.

Both AMCA 210 and the ISO standard allow testing fans under four test configurations, also referred to as installation categories. And each of them impact the performance output of the test procedure.

Therefore, in order to ensure that products are tested in a consistent way and provide comparable results, DOE is considering specifying a single test configuration for equipment class in its DOE test procedure.

And here we have comment boxes related to test procedure and efficiency metrics. But first on test procedure DOE requests comment on the use of AMCA 210 as a basis for the development of a DOE test procedure.

DOE requests comment on AMCA Standard 220 for measuring performance of cross-flow fans, and DOE requests comment on using a clean air only test procedure for dust, air, or material handling fans.

FACILITATOR BROOKMAN: Mark.

MR. STEVENS: Mark Stevens from AMCA. I'd like to comment, actually, on these next three items.

FACILITATOR BROOKMAN: Please.

MR. STEVENS: We do agree with using AMCA 210 for testing fans. We have some comments later on regarding the scope and classifications that will modify the comments I am making right now. But for induced flow fans, I'd like to comment now that AMCA 260 should be used for induced flow fans.

FACILITATOR BROOKMAN: Say it again, for?

MR. STEVENS: Induced flow fans.

FACILITATOR BROOKMAN: Induced. Okay.

MR. STEVENS: Regarding 3.3, regarding using the AMCA 220 for cross-flow fans, we would say no cross-flow fans. AMCA Standard 220 is a test standard for air curtains. It is not for individual fans. Cross-flow fans would be tested under AMCA 210.

But, again, later we've got some more comment on whether or not cross-flow fans should be included in the scope of the rulemaking.

Regarding 3.6, we propose that, yes, material handling fans should be tested using clean air. Efficiency of the slurry, I suppose you could say, of the material going through a material handling fan is increased by the material in that slurry. But efficiency of a fan is not dependent on density.

FACILITATOR BROOKMAN: Okay. Thank you. So that was a pretty comprehensive review of those three additional comments on those three.

Okay. We are moving on.

MS. IYAMA: Okay. Two more comments. DOE requests comment on which test configuration should be considered for each of the considered equipment classes which are listed here.

And then DOE requests comment on requiring an air straightener to reduce air swirl at the outlet for axial fans tested in configuration B or D.

FACILITATOR BROOKMAN: Mark?

MR. STEVENS: Right. If could go on, again, we have some comments later on regarding the scope of the rulemaking. Again, we'd like to say that AMCA 260 should be used for induced flow fans, and AMCA 210 for the remainder.

What we'd also like to suggest is that the manufacturer be allowed to choose the installation type in which their fans are rated, because they are normally catalogued and presented to the public in which -- these ratings are presented to the public in the way their customers use them.

And we would think that it would be

an undue burden on our manufacturers if they were forced to rate installation types that their customers couldn't use.

Regarding 3.8, air straighteners, this is another European construct that, no, we don't agree with using the air straightener for axial fans. Actually, tube axial fans are a subset of axial fans.

And we have done a tremendous amount of research on this particular topic, and what the straightener does is actually add uncertainty to the test rather than increase the certainty or the uncertainty of the test, reduce the uncertainty of the test.

So, no, we don't agree with the straightener. As a matter of fact, ISO 5801 has a new draft, and there is a new work item proposal inside, TC117. AMCA is a technical advisory group to that.

The chairman delegation, the secretary, convener, and they have proposed a draft that essentially eliminates the straightener for tube axial fans. But we are going to agree with that.

FACILITATOR BROOKMAN: Okay. Interesting. Other comments on these two from other parties? Yes, please.

MR. WAGNER: Greg Wagner. I echo AMCA's request that we consider AMCA 210 as the standard for testing most fans. I'll leave aside the cross-flow for other folks. But with regard to the test configuration, absolutely they should be tested in the configuration they are designed to be used to make sure that the performance and outcome is similar to what it is being tested and evaluated under.

FACILITATOR BROOKMAN: Okay. Other comments? We're moving on.

(No response.)

Okay.

MS. IYAMA: Okay. So the output performance measurement of the DOE test procedure will be used to develop a metric that will allow comparing fan energy performance across products. This metric could be based on efficiency.

Current efficiency definitions for fan include peak total efficiency, which is the ratio of fan air power output to fan shaft power input for the operating conditions for which this value is at its highest.

Current fan efficiency definition also include overall efficiency, which is the fan peak total efficiency multiplied by drive components efficiency. These components include the motor, any components between the motor and the power supply, and any mechanical device between the motor and the fan.

A potential metric that could be considered for bare shaft fans is the fan efficiency grade, the FEG, as developed by AMCA 205. As shown on this graph, the FEG is efficiency as a function -- peak total efficiency as a function of the fan's impeller diameter. And it does not differentiate across different fan types, and DOE is interested in evaluating an FEG metric by developing fan efficiency grades unique to each equipment class.

DOE is also interested in potentially expanding the FEG approach to not only be looking at total peak efficiency as a function of fan impeller diameter, but also as a function of operational parameters, for example, specific speed. So we would be looking at total peak efficiency as a function of impeller diameter and specific speed.

In order to provide an example of what this expanded FEG metric could look like, we collected performance data for about a thousand fans, and we plotted peak total efficiency on the vertical axis as a function of impeller diameter and specific speed.

This is just an example for the thousand fans that we collected information for. The surface represents the average total peak efficiency. What this means is that for this sample we had 50 percent of our models with a peak total efficiency above that surface, and the other half had total peak efficiencies falling below that surface.

So it is the average peak efficiency as a function of impeller diameter and specific speed. And that is a 3D view. And on the next slide it's the same information, but collapsed onto a 2D view.

We have the total peak efficiency on the vertical axis, impeller diameter on the horizontal axis, and here the specific speeds are represented as different colors. And here we see that we have something that looks similar to the FEG as developed by AMCA.

So that's for the discussion of potential metrics for bare shaft fans. And in the next slides I will discuss potential metrics for combined fan equipments.

If DOE is considering covering combined fan equipment, which is what is discussed under regulatory regimes two and three, the metric may need to consider motor efficiency and VSD efficiency. The metric may also need to be able to capture the energy impacts from using a fan with a VSD in comparison to using a fan without a VSD.

One example of a metric which incorporates motor and VSD efficiency is the European fan motor efficiency grade, the FMEG, which is expressed in terms of overall efficiency calculated with a VSD compensation factor.

So DOE is considering a different metrics approach, and for regulatory regimes two and three, as we saw earlier, we would have two sets of equipment classes. This could be rated -- these two equipment classes could be rated using separate metrics or similar metrics.

And here this table provides a summary of the metrics approaches and provides examples for each regulatory regime. So, for example, if we are under a separate metrics approach and under regulatory regime two, we would have two sets of equipment classes, fans sold without VSD and fans sold with a VSD.

And for fans sold without VSD one possible option could be to use fan peak total efficiency to compare fans -- fan energy performance across fans sold without VSDs.

For fans sold with VSDs, one potential metric option could be to use overall efficiency as the metric to compare fan energy performance across fans sold with VSDs.

Another example of a separate metric approach, this time for regulatory regime number three -- so, again, we would have two sets of equipment classes, fans sold without motors, fans sold with motors.

For fans sold without motors, one possible metric option could be to use fan peak total efficiency to compare fan energy performance across fans sold without motors. And for fans sold with motors, one possible option would be to use an electric input power-based metric to compare fan energy performance across fans sold with motors.

And here we would be evaluating fans sold with motors and fans sold with motors and VSDs under the same category. So we need to be using a metric that allows capturing the energy impacts of using a fan with a VSD in comparison to using a fan without a VSD.

So that's it for the test procedure and efficiency metrics section, and we are going to the comment requests. DOE requests comment on the appropriateness of using publicly available performance data in lieu of original test data, so that's for developing the 3D graph that was shown earlier.

DOE requests original fan performance data generated from AMCA 210 tests. DOE requests comment on the considered efficiency metric approaches for bare shaft fans. DOE requests comments on the European

FMEG efficiency metric for fans sold with motors.

FACILITATOR BROOKMAN: Yes, Mark.

MR. BUBLITZ: Mark Bublitz, New York Blower Company on behalf of AMCA. With respect to 3.9, we would encourage DOE to use AMCA-certified data. That would be data that carries the AMCA seal. Those products are engaged in the CRP-certified ratings program where the AMCA attempts to do its best to validate the published data against certified and tested product.

FACILITATOR BROOKMAN: Is that certified against the catalogue or something?

MR. BUBLITZ: Yes. Well, really any published data, electronic and printed/published.

FACILITATOR BROOKMAN: Okay.

MR. BUBLITZ: Item 3.10, technically, that test data is owned by the manufacturer. So I'm sure if you'd contact the manufacturer some, whatever you call it, privacy release, NDA or something, could be released from AMCA.

And then, just on Item 3.11, I was wondering if it would be possible to obtain the exact algorithm, the exact equations that were used to produce the 3D -- the precise definition of specific speed. So I'd like to send my data through the same engine to see what we get.

That's all my comments. Thank you.

FACILITATOR BROOKMAN: Thank you.

Anybody want to respond to what -- I'm sorry. Anybody that wishes to respond to 3.11(B), the EU's FMEG efficiency metric?

Yes, please, Tim.

MR. KUSKI: Tim Kuski representing AMCA. I would like to reply to Items A, B, and C, all together. But I have a few slides that we are going to bring up --

FACILITATOR BROOKMAN: Yes.

MR. KUSKI: -- so I'm going to wait until after questions 3.18 through 19 --

FACILITATOR BROOKMAN: Okay.

MR. KUSKI: -- are complete.

FACILITATOR BROOKMAN: Okay. Then, let's go to three -- well, before we move on, then, additional comments -- yes, Gary -- on this first comment box on page 46?

MR. FERNSTROM: Gary Fernstrom. I would like to note that we support DOE covering fan motor combinations with the VSD as the design option, in addition to the bare shaft fans in the rulemaking. And we recommend that DOE develop an input power-based metric wire to air efficiency, for example, to reflect the overall system efficiency of fans sold with motors and controls.

FACILITATOR BROOKMAN: Okay. Other comments on these before we move on?

(No response.)

Then we are going on to the next comment box.

MS. IYAMA: Okay. So Item 3.11(C),

DOE requests comments on the use of overall efficiency for fans sold with both motors and VSDs.

3.18, DOE requests comment on the use of input power-based efficiency for fans sold with motors.

3.19, DOE requests comment on whether fans that perform under variable load conditions should be required to meet multiple standards.

3.20, DOE seeks comment on setting standards based on different efficiency metrics for fans sold alone and fans sold with motors and VSDs.

FACILITATOR BROOKMAN: Mark?

MR. STEVENS: Yes. We do -- this is Mark from AMCA. We do have some further comments, but I think the slides from Tim will put this in -- our further comments on these questions into context. So maybe we can go through the slides first and then make our comments.

FACILITATOR BROOKMAN: Okay. That sounds good.

Jack, can you queue or --

MS. IYAMA: I can do it.

FACILITATOR BROOKMAN: Sanaee has got it. Okay.

(Pause.)

MR. KUSKI: Tim Kuski with AMCA. These issues of the metric are very important, so I want you to give me about five minutes to walk through these few slides and talk about the bare shaft metrics and the overall metrics.

And I'm going to start with the FEG and commenting on it. FEG is a very good indicator of aerodynamic fan quality for fans with ducted discharges. Specifying FEG-only is not a guarantee of energy savings, however.

AMCA recognized this when we created Standard 205, which defines a fan efficiency grade. And in there we required that the fan must be selected within 15 points of peak total efficiency in an effort to save energy.

So what you see on the screen up here, in our industry fans are typically selected with electronic selection software where design engineer enters CFM and pressure. Here there are seven different sizes, different wheel diameters. And if you look at the first column they are from 36 inches up to 66 inches, and it is only one model of fan. It is a belt-driven, air-foil, double-width fan.

But all of these will do 80,000 CFM at three inches of pressure. And look at the FEG column. Every one of them is an FEG 85, which indicates, if selected properly, that these are very efficient fans.

But look at the shaft brake horsepower over in column four. For the 36-inch fan, the smallest fan, it requires 114 horsepower to do that. And for the 66-inch diameter, the biggest fan, it requires 50 brake horsepower. So there is a two-to-one ratio there, more than two to one in power.

And, unfortunately, first cost is typically the major driver for our customers that select these fans. So most likely they would pick a 40-inch fan here, lowest cost, and it's only 62 percent total efficiency.

Next slide, please. Number seven.

So what I want to demonstrate here is the wide range of efficiencies found in a fan. And I'm not a motor expert, but I do know motor efficiencies stay pretty constant from full load to about half load. They drop a little bit. In fans, however, they drop a lot.

So what we have here is a fan curve. The solid line is fan total pressure. There is the CFM. And the dashed line is total efficiency versus CFM. And this is a constant RPM fan curve, so this fan would have a stable operating range from about 60,000 CFM to 120,000 CFM.

Now, the efficiency varies widely over this range, this CFM range. It peaks out at about 83 percent at 80,000 CFM, and it drops to a low of less than 50 percent as you move out to its maximum flow or 120,000 CFM.

Slide number eight, please.

Now, a more reasonable selection range for this fan would be to limit the selection from about 60,000 CFM to 100,000 CFM. Now, ASHRAE 90.1, in Addendum U, employed this by specifying not only a minimum fan efficiency grade but that the selection must be within 15 percent of peak total efficiency.

That was my answer to 3.11(A). I want to move to 3.11(B) now, which -- go ahead.

FACILITATOR BROOKMAN: Let's see if we have questions here.

MR. CYMBALSKY: So on the first slide -- John Cymbalsky, DOE. I assume there was a reason why you put the weight column here, but -- and I fully appreciate that your customers may want to know that number. Is that a big issue in how your customers purchase this product? And maybe if you can expand on that a little bit.

MR. KUSKI: Tim from AMCA again. You know, they may consider other things other than cost. I said that was the primary driver. But they may consider efficiency sometimes. But they are also concerned about physical size. I think that is very big.

And each one of these fans represents about a 10 percent increase in wheel diameter from size to size, so you can imagine the physical cube is getting 10 percent bigger length, width, and height.

And so, yes, weight does become a feature, an issue. You know, rooftop-mounted equipment or something that is, you know, not sitting at grade level.

Another issue that I'm not bringing up at all in any of these slides is sound considerations. The smaller fans running at higher speed will generate more sound energy also.

MR. CYMBALSKY: So if you could, all of those features that you mentioned, would you -- are you saying that the efficiency is probably the last thing they are thinking of, or is it in the middle, or --

MR. KUSKI: You know, I can speculate on that. However, we have kept track of data within our company of all the fan selections that people have made, and we can demonstrate that they are selected far to the right of peak efficiency. And they are typically one to two sizes smaller fans than they should be.

MR. CYMBALSKY: Okay.

FACILITATOR BROOKMAN: You said first cost was the big driver.

MR. KUSKI: Yes, I did. First cost is the big driver.

FACILITATOR BROOKMAN: Okay.

MR. CYMBALSKY: Thank you.

FACILITATOR BROOKMAN: So did you finish with those slides?

MR. KUSKI: I am ready to move on to the next subject. We can just hold that slide for a second.

Now, I want to answer 3.11(B), which talks -- which comments on the European FMEG, which is an overall fan efficiency. The main reason AMCA in the United States here selected FEG based on shaft horsepower is because most of the products that we sell at this time are still belt-driven, and the number of different permutations to test and rate all of our motor, belt drive, and motor drive/fan combinations is huge. And I'll get to quantifying that.

The Europeans use mostly direct driven equipment, and they have much fewer end items or SKUs, and they selected the fan motor extended product metric.

Slide number nine, please.

Or, excuse me. Each of the fan manufacturers make many different styles or types of products based on application. A lot of these are belt drive; some of them are direct drive. So I'm just going to let you look at all of those different looking fans.

It's a lot broader than just saying, "Hey, I've got a centrifugal, I've got an axial, and I've got a mixed flow." There's lots of different shapes and sizes.

Next slide, please.

Within each fan type, there are many different sizes. So what I have here is a backward-inclined single-width fan. And if this had wheel diameters from 12 inch to 73 inch, you would have 19 different physical sizes within one fan type.

Next slide, please.

Each fan's size has multiple horsepower motors applied to it, with different enclosures, different voltages, different motor efficiencies. The customer might specify a certain efficiency that might not be NEMA premium, and there is numerous, numerous belt and pulley combinations.

Next slide, please.

So here is just the typical manufacturer that has, let's say, 40 direct drive fan types and 60 belt drive fan types. And what I am using here, I want you to know, there are some very conservative estimates I have used to drive these permutations, okay? So the numbers I show on the bottom of the page are low.

First of all, the direct drive fan, if you assume you have 40 different fan types with 10 sizes per fan type, and five motors for each fan size, you get 2,000 end items or SKUs for the direct drive fan.

On the belt drive, if the manufacturer has 60 different fan types, 16 sizes per type, 30 motors per size, seven belt drive combinations for each motor, you get 201,600 different end items or permutations.

So for us it is virtually impossible to test and rate the efficiencies of this motor drive and fan combination.

So this is the primary reason AMCA fans produced in the United States we selected the FEG bare shaft metric over the extended product or FMEG metric. And I'll pause here for questions.

FACILITATOR BROOKMAN: Bob.

MR. BOTELER: Yes. We put this together to kind of demonstrate, because we were thinking in terms of what we did with motors when we came up with our definition for basic model. And the analogy that I gave them is on motors we looked at just a horsepower speed and enclosure.

And we have to submit data for the motor population from one to 200 horsepower. It's 113 ratings, and we are trying to come to grips with what did this translate to when we got to all of the variables that were involved with fans. And it's a pretty significant difference between fans and motors.

FACILITATOR BROOKMAN: Okay. Thank you.

Yes, Louis.

MR. STARR: I had a question back on the slide with the chart. I want to say it's Slide 4 probably. It's the one with all of the fan selections. There you go. That one.

I'm wondering on this case here, if they have -- is there is a brake horsepower for CFM limitation on that, would that help in the fan? In other words, it would keep people from selecting too small a wheel for a given flow?

I mean, I'm looking on there and you've got efficiency of 56, 62, and 68. And it looks like the horsepower, if you divide it by the CFM you could come up with a number kind of similar to what 90.1 has to have a brake horsepower CFM limitation.

If you are selling both items -- a

fan and the motor -- could that not be applied in that metric? Or would that not really be practical?

MR. KUSKI: Tim from Greenheck. The big problem with a simple CFM per horsepower metric is that always -- that varies with the pressure. It also varies with the CFM. So, you know, I've seen that applied to agricultural fans where the pressure is always constant. It might be an eighth of an inch.

And then they also normalize it per fan speed and fan diameter. So they control a lot of the variables, and then they are able to establish a metric like CFM per watt or something like this.

MR. STARR: Is that what they are trying to get at with the specific speed, kind of, they are talking about that three-dimensional -- because that's what they are essentially getting into, some of the pressure effects, and what you are trying to achieve with it.

MR. KUSKI: I think with -- Tim again from AMCA. With specific speed, there are different types of fan designs that fit themselves well for low pressure/high flow and high pressure/low flow.

MR. STARR: Right.

MR. KUSKI: And the theoretical peak efficiencies vary across that whole spectrum. Hence, you saw that shape to their chart. So --

MR. STARR: If, though, inside of a given classification of fan, like forward curve, you had certain amounts of, you know, requirements for efficiency in that area. And then, when you switch it to another fan type, there was another efficiency requirement. It would kind of be the same graph they had, except it would have different heights of roofs in it.

MR. KUSKI: You are correct. Yes.

MR. STARR: So that would maybe

work. Okay.

MR. KUSKI: Yes.

FACILITATOR BROOKMAN: Dan, did you want to comment here?

MR. HARTLEIN: I was just going to reiterate that one of the things we are trying to make sure that we clarify here is the importance of the proper selection. And if we regulate the fan manufacturer without somehow addressing that issue, the unintended consequences of this becoming worse could show itself.

So somehow in this effort the Department of Energy and all of us have to figure out how to solve that problem. Okay?

FACILITATOR BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I understand your concern, but, remember, this is a manufacturing standard, not a design or a selection standard. That is up to the end user. DOE has no control over that.

MR. HARTLEIN: Dan Hartlein again from AMCA. I hate to say this, Steve, but it doesn't work then. It has to be addressed.

Thank you.

FACILITATOR BROOKMAN: Andrew, yes.

MR. deLASKI: Andrew deLaski. So the costs go up from the smaller fan to the larger fan with that one anomaly, though. That first one is more expensive. What is going on there?

MR. KUSKI: Tim from Greenheck. I would guess that a 36-inch fan is a 125-horse motor, which raises first cost. And it may be a Class 3 construction, meaning it has got to run at a much higher speed and pressure.

MR. deLASKI: So at some point -- so the costs go up, but if you get too small, and then you've got to compensate in other ways that drive your costs up and --

MR. KUSKI: That's right. Good question. Good observation.

MR. deLASKI: But it strikes me, just about Steve's question, is that, you know, what I'm hearing you guys say is you need to construct this in such a way that you don't foster -- you want to foster better selection. And you can -- so how do we think about this in ways that foster better selection and certainly don't go in the wrong direction.

MR. KUSKI: Right.

MR. deLASKI: Because I think you can design things that --

MR. KUSKI: Right. Because as we design more and more efficient products, it probably costs more to produce them.

MR. deLASKI: Right.

MR. KUSKI: And if the market doesn't bear that extra cost, they are going to drive down this size.

MR. deLASKI: Right. And, again, in response to Steve's question, you can't dictate what consumers choose, but you certainly can affect relative prices and that will affect consumer choices.

FACILITATOR BROOKMAN: Yes. Go ahead, Dan.

MR. HARTLEIN: Yes. Again, Dan from Twin City Fan and AMCA. I would just pose the question -- and I agree with Steve that, you know, you can't regulate the end user's decision. But perhaps there is an opportunity to regulate the data in what we sell. Just another angle to think about it.

I'm not sure how that works, but somehow if we can limit the selection output from our software as part of this, or the marketing materials and the data that is published, I think you can start to have an influence there.

Thank you.

FACILITATOR BROOKMAN: Karim.

MR. AMRANE: Karim Amrane. Actually, one can go even further and say, well, I'm not sure why you need to regulate, because with an efficiency metric like this you are not going to get -- it's not going to tell you how the fans operate and how they are -- their energy consumption.

So one could argue that metrics alone will not do it.

FACILITATOR BROOKMAN: Michael, did you want to follow on?

MR. IVANOVICH: This is Michael Ivanovich, AMCA International. And to reiterate, this is why the AMCA 205 standard has not only the efficiency definition -- you know, it defines how to calculate a fan efficiency grade, but also includes that 15 percentage point selection window, which has been adopted into all of the codes and standards and have adopted AMCA 205.

FACILITATOR BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. I appreciate all of the feedback. And, again, as we go forward, we also have to remember that the standard is for new and replacement fans.

So in areas where the fans are already on a space constrained roof, or enclosure inside a building, depending on how the standard eventually is structured, if it somehow is structured that, you know, you can only use a 54-inch fan, or something like that, there might be some issues with the replacement market. Again, hopefully that won't happen. Hopefully, it will be designed in a way -- but, again, just thinking about, you know, the space constraint can be an issue in retrofits.

FACILITATOR BROOKMAN: Do you have more to --

MR. KUSKI: I am finished with the slides.

FACILITATOR BROOKMAN: Yes. Okay.

MR. KUSKI: And then I've got one more comment on 3-11(C).

FACILITATOR BROOKMAN: Please do.

Yes.

MR. KUSKI: And that's the overall efficiency of fans sold with motors and VSDs. First of all, like you heard a couple of times this morning, fan manufacturers don't sell to VFDs.

Second, and -- I'm saying VFDs, variable frequency drives, the electronics.

FACILITATOR BROOKMAN: I thought you said F, right, yes.

MR. KUSKI: Frank. Very --

FACILITATOR BROOKMAN: Yes.

MR. KUSKI: Second, these VFDs are unregulated, and there is not a lot of accurate efficiency information out there right now. It is hard for us to be held accountable for the efficiency of a product that we don't manufacturer; we simply purchase it.

And my whole permutation slide, if you had VFDs on top of that and that gets, you know, another order of magnitude added to it --

FACILITATOR BROOKMAN: I think I know the answer. You are careful to differentiate between VFDs and VSDs. So what about VSDs?

MR. KUSKI: Most of our belt driven products you could say have a VSD, especially 15-horsepower and over. They are adjustable in situ. And I guess over 15 horsepower, if you had a belt drive, even though it is a fixed pitch pulley, you can simply change a pulley in the field to match to a certain load point.

FACILITATOR BROOKMAN: Yes. See, now that was -- to me that was the definition of -- this other gentleman was referring to where it was a part of the VSD, was a part of a system where you've got controls and, you know, it wasn't an adjustment in the field that would customize, but -- right? It would be -- you know, that's what I was thinking, but that was just me.

Okay. Michael.

MR. IVANOVICH: Just on the 3-20 a little bit, going back to the DOE proposed definition of fan manufacturer, it is an entity responsible for assembling a fan into a testable configuration, such that the fan and power is fit to a shaft, bearings, and in some cases installed with a housing component.

That definition of a fan manufacturer doesn't include the extended product aspects, and we are curious how, you know, basically with 3-20, you know, who would be held accountable to an extended product definition, you know, with the efficiency metrics and things like that if the manufacturer doesn't make those products or if they are assembled down the line by a distributor or a contractor.

FACILITATOR BROOKMAN: Yes. Yes. That's a question that has been faced in other rulemakings. Steve.

MR. ROSENSTOCK: Steve Rosenstock,

EEI. If you could go back -- again, these slides are terrific. So comment on Slide 45, and this has to do with I would say 3-20, in terms of 3-20.

I will speak on it from a utility and maybe possibly kind of thinking about the customer perspective. If there was a way eventually down the road to harmonize the metrics so that -- to make sure that, you know, it's an apples to apples comparison for the customer, person actually buying the product, I think that will help out immensely.

I hope we don't go into a situation where, you know, one efficiency metric, if it says 81 percent and the other one -- or other test method says 85 percent, but the one that says 81 percent will actually have lower energy use and lower energy cost because of the test method.

So if there is a way to harmonize, I don't know if it's wire to air or just only using overall efficiency. Among all of the different products, I think that would be of most benefit to the end use customer.

And then, if you go back to I'll say -- let's just go to Slide 42. I think it makes it easier, because you have a question about 3-19. This is about the variable load conditions.

Just as I have been involved with appliance standards for longer than I would probably care to admit, typical test procedure or one testing point -- for example, for transformers it is 50 percent load for a liquid filled transformer. For dry type it's 35 percent load. EER is 95 degrees ambient, outside air, period. That's it.

With this type of system, especially with variable speeds, I mean, right now you're showing like 18 or 19 specific speeds on that chart that a fan could be operating at. So I can see -- you know, if you have a -- I'll just say you have the fans without the variable speed controls -- I'll just say controls -- versus the fan with controls.

If there is a way, again, comparing apples to apples, if you had more than one test point condition, to have it the same for both the constant and the variable type of fan applications. Again, I think that would help the market the best.

Again, it would be -- again, it would be kind of precedent-setting, just because other appliance standards had to be one point. That's it for the --

FACILITATOR BROOKMAN: Okay.

MR. ROSENSTOCK: -- efficiency.

FACILITATOR BROOKMAN: Mark.

MR. STEVENS: This is Mark from AMCA. I just want to clarify what that slide is showing. It's showing peak efficiencies for different types of fans that have characteristic specific speeds. Right? So the speed is a characteristic -- specific speed at peak efficiency, right?

MR. ROSENSTOCK: Okay. My thought was suppose you have a fan -- a variable speed fan with different, you know -- okay.

FACILITATOR BROOKMAN: Tim. I'll come back to you, Louis. Tim.

MR. KUSKI: Tim from AMCA. The primary reason we are advocating the FEG or the fan shaft brake horsepower is because we can conduct a very simple test. That fan curve I had up a few slides ago, we can put that up to a chamber and within 20 minutes approximately we know all of those performance points.

And by using the fan affinity laws or fan laws, we can generate that curve at all different speeds, the whole matrix of operating points.

FACILITATOR BROOKMAN: Louis.

MR. STARR: Yes. If you'd switch back to Slide 45. One of the things on this one here, if you went with Item 3, since the fan manufacturers don't actually, it sounds like most of the time, sell it with the VFDs, you would really only be subjected to the first one, the bare shaft fans, where you are putting the motor power and the fan and the motor together.

And your presentation of where you had the sheet that the -- they were selecting a lot of bad motors, that would take care of that issue by going with Item 3.

So, and it sounds like the VFDs, since you don't sell them that way, you don't really need to be concerned. But if you start selling them that way, then it would address some of the concerns you had. So just a thought.

FACILITATOR BROOKMAN: Dan.

MR. HARTLEIN: If I can clarify, it wasn't selection of bad motors. We were demonstrating selection of bad fans. Maybe --

MR. STARR: The combination of bad fans and motors.

MR. HARTLEIN: Yes.

MR. STARR: In other words, selecting the wrong fan wheel and maybe a more bigger fan wheel instead of using a smaller fan wheel.

MR. HARTLEIN: Again, and I don't want to sound like a broken record, but just to reiterate, if we don't find a way to control and encourage the fan to be selected within a certain range of its peak efficiency, everything we do here will be for naught. It will not provide energy savings. We have to figure out how to do that.

MR. STARR: Well, one thing is Addendum U kind of hits that side of the fan selection, because it -- and that will be going into think -- but the other side of it is the actual equipment side, which then could also limit some of that problem as well. So I'm thinking the combination of those two would work well.

FACILITATOR BROOKMAN: So final comment. Michael? No. Mark?

MR. STEVENS: There was a specific -- I'm sorry.

FACILITATOR BROOKMAN: Name.

MR. STEVENS: Oh. Mark again from AMCA. There was a specific question on EU's FMEG program. And I should mention that AMCA had looked at that, and there were a couple of items inside that regulation that were just unacceptable to the North American manufacturers.

And they both had to do with bonuses and penalties. One was a matching of components penalty, a 10 percent penalty. And then there was the part-load compensation factor. It was basically a bonus for folks that sold fans with VSDs.

And so those are two things that the North American manufacturers couldn't tolerate actually.

Regarding the permutations, you know, Tim is right, you know, that's a very difficult not -- to overcome. There is a task

-- but we also understand the desire for a wire to gas type or wire to air efficiency metric. And so at AMCA there is a task force that is looking at this.

And so they envisioned three things becoming available. One is the FEG metric, which Tim has talked about quite a bit and very eloquently. A second one is a tested wire to gas. Now, as we mentioned before, there is not many people in the States that are doing that, but we want to make that available in case there is manufacturers that have a limited number of variations of their fans.

And, finally, there is another permutation to that and that would be a tested fan efficiency as addressed in AMCA 210, with some standardized losses for motors, belts, VFDs, motors, and so on.

And this task force, I need to mention, is not just a North American task force. There is six North Americans on there, and there is four folks from Asia. So it is truly an international task force.

We are excited about this, I am actually in particular, because two of the Asian members are Chinese and they happen to be on the Drafting Committee for GB19761, which was mentioned in the rule -- in the framework document as something that could potentially be looked at.

But the reason we are excited about that is that we -- we feel that there is an opportunity for harmonization across the globe around this document, and that we anticipate that the Chinese will adopt this AMCA standard because we have part of their folks on this Drafting Committee.

FACILITATOR BROOKMAN: Okay. Thank you.

MR. STEVENS: All right.

FACILITATOR BROOKMAN: Louis?

MR. STARR: So it sounds like that document that you are working on -- or test procedure, it seems like it is part -- it is similar to the FMEG, just has improvements to it.

MR. STEVENS: Well, right. You know, the -- one of the first documents they are looking at is ISO 12759, which is the underlying ISO document for this EU 327, right?

So, but as I mentioned, these compensation factors are just warts that have to be taken off, and I don't think that they are going to -- those won't survive.

FACILITATOR BROOKMAN: Okay. So we've covered a lot of ground. And we didn't get quite as far before lunch as we thought we would, but maybe we're not too far off.

Let's pause for lunch. It's now 12:20. It pretty much takes an hour to eat lunch and get back here. Do not leave the Forrestal Building. For those of you that are not familiar with the Forrestal Building, you go down to the ground floor, and you go about

100 yards in that direction and there is a big cafeteria. Up two escalators.

You just wear this badge in the room -- in the building. This room will be locked. It will be -- so you can leave your stuff here. You might need an ID to get back in through the security apparatus. I needed one this morning.

So good progress this morning, and we'll see you back here to resume at 1:20.

(Whereupon, at 12:20 p.m., the proceedings in the foregoing matter recessed for lunch.)

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

1:22 p.m.

MR. BROOKMAN: Okay, let's resume. We are going to commence with the Market and Technology Assessment section. We're on about Slide 50 and we're going to hear again from Sanaee.

MS. IYAMA: Okay, so I'll start presenting the rulemaking analysis starting with the content of the preliminary analysis. In the next couple of slides, we'll go through the content of each chapter and I'll start with the Market and Tech, Market and Technology Assessment.

For the Market and Technology Assessment, DOE identifies and characterizes manufacturers of commercial, industrial fans. It establishes equipment classes, estimates shipments and trends in the market; identifies technologies that could improve efficiency, as well as identifies regulatory and non-regulatory initiatives intended to improve the efficiency of the equipment covered under the rulemaking.

One main task of the Market and Technology Assessment is to establish the equipment classes. DOE generally sets separate energy conservation standards for each equipment class. Here, on this slide, we have listed the equipment classes that are proposed in the framework document. So first we looked at the different aerodynamic characteristics of the fan. So that's the fan type categories for fans and blowers. We have axial, centrifugal mixed flow and then the blowers. We also divided the equipment classes by whether the fan was housed or unhoused, additional safety features and also by equipment utility, product utility as dictated by the impeller geometry.

So generally, the equipment classes are divided by performance-related features that may impact the utility of the product and therefore would justify separate energy conservation standards. And so this list is for a Regulatory Regime 1. And if we were to consider Regulatory Regimes 2 and 3, we would have sort of another set of equipment classes that would mirror this set of equipment classes.

MR. BROOKMAN: So the equipment class differentiation is important and it may be that the manufacturing community doesn't have a full range of comment at this time, but if you do, that would be useful for the Department.

MS. IYAMA: Right. Another part of the Market and Technology Assessment is to identify the technology options to improve efficiency and here we have listed the technology options as identified in the framework document, first for bare shaft fans and then for the fan combined equipment. So you can see them on this slide.

Next, we get into the comment boxes. First slide, comments on the market assessment in general, then we have two slides on the comments for equipment classes and then technology options. So I'll start with the first two comments.

MR. BROOKMAN: Yes, yes. Let me just make sure I'm with you. Yes.

MS. IYAMA: DOE requests information that would contribute to the market assessment for fans. Examples of information include current equipment features, efficiencies and efficiency trends, historical shipments and prices by equipment class. DOE requests comment on the estimates of the number of U.S. fan manufacturers that could be considered small businesses.

MR. BROOKMAN: So let's go with those two first.

Michael, are you ready?

MR. IVANOVICH: Yes, Michael Ivanovich, AMCA International. AMCA advocates that DOE accepts AMCA's proposal for classes that we're going to be coming up within a little bit. AMCA is going to be actively researching its members for market information, but we cannot provide or will not provide pricing information because that information is confidential with our members. DOE would be pursuing that kind of information with individual manufacturers under nondisclosure agreements.

AMCA reminds DOE that some data will be hard to find because of the nature of small businesses, they don't all have sophisticated information systems with databases that track shipments and things of that nature, so there's going to be a lot of manual pulling through their data type of thing.

MR. BROOKMAN: Is there a common catalogue that's referenced? I'm wondering about how this data from many different companies, how it would be aggregated?

MR. IVANOVICH: You have catalogues, but you're looking for some things but like, for example, trend information, historical shipments and prices. That's the kind of thing that they're going to go back into the records manually for many of them.

MR. BROOKMAN: Okay.

MR. IVANOVICH: We'd also like to say that some information will be available by the comment deadline, but we're going to probably have to provide more information after that deadline as well.

MR. BROOKMAN: And 5-2, estimates of the number of U.S. fan manufacturers that could be considered small businesses?

MR. IVANOVICH: AMCA affirms DOE's estimate of small businesses is in the ballpark. DOE estimated about 87 percent by employment according to Small Business Administration definitions. Based on our estimates and based on revenue, less than $10 million a year were on 80 percent, and we view these high percentages suggest that a phased approach to regulation is necessary.

MR. BROOKMAN: Okay. I welcome any additional comments on these two before we move on.

MS. IYAMA: Now comments related to the equipment classes. DOE welcomes comment on performance-related features that DOE should consider when defining fan equipment classes. DOE requests comment on whether transmission type should be considered when determining equipment classes. DOE requests comment on whether the development of separate equipment classes is necessary to accommodate different performance characteristics of fans sold bare shaft versus fans sold with the motor transmission or controls.

MR. BROOKMAN: Maybe we could just stop there and do the top three first. Performance-related features of equipment classes. Are we all in a position to -- could you go back to the equipment class?

Yes, Tim?

MR. KUSKI: Tim Kuski representing

AMCA. At the appropriate time, I've got two more slides I'd like to go over, but it would address all of the issues in 5-3 through 5-17. So whenever that's appropriate, I'll address that.

MR. BROOKMAN: I'm wondering whether you should do that early or do that after we receive other comments.

MR. KUSKI: It may be good to start it out, start the discussion.

MR. BROOKMAN: Okay.

MS. IYAMA: Since it covers 5-3 through 5-17, I didn't read through the comments.

MR. BROOKMAN: That's okay. We'll double back.

MS. IYAMA: All right.

MR. KUSKI: And start on -- I think it's Slide 2. That's it. So these slides aren't as exciting and colorful as the other ones, but it's still going to help tell the story.

MR. BROOKMAN: It's pretty exciting.

MR. KUSKI: That's right. This is after lunch. I should have had them now. So I guess what we're going to do here is ultimately make some proposed changes to the DOE bare shaft equipment classifications that were shown up on Slide 51. And what we're going to do is we're going to propose 12 different classes. However, we're going to suggest that the last two be exempt, so essentially we're proposing ten different equipment classifications for this regulation.

And the reason we're doing this is we think the proposed classes are a little too broad in scope and they inconsistently include geometry which was referred to as aerodynamic shape. And it also included application, like one was for dust-laden air and one was for clean air.

What we're worried is that the DOE proposal could eliminate complete types of fans that were created to meet a specific application need, impacting their utility and having the unintended consequence of using more energy. So when we laid these new categories out, it was based on application, things like pressure, the way you install it, whether that fan is typically ducted or nonducted. And bear in mind and we know this, the audience may not, but when we design fans to do certain types of jobs, for example, to sit on a rooftop and protect the discharge, from weather from coming in, we impact the efficiency of that fan. We lower it.

On this slide we're looking at here, I want to give an example. Right now, one of the first classifications is centrifugal clean air housed equipment. Now right now this would include an air foil centrifugal, a backward curved centrifugal, a backward inclined centrifugal, and a forward curved centrifugal. And the efficiency of those products varies widely. So if there was a minimum setoff there, a minimum efficiency standard established, a whole product line, for example, the forward curved fan could be eliminated.

And the forward curved fan is shown in the top image. Excellent solution for ducted fan applications at low pressures and it results in very low first cost. It results in a low energy cost. It has a very compact size and it's used for low sound.

In a typical application of forward curved fans in commercial ventilation, bathroom exhaust, return and exhaust fans and air handlers, and general exhaust fans.

Next slide, please?

Here's another category that could cause some problems and it's low pressure applications without an outlet duct. And a typical application is a power roof ventilator.

Even with the low FEG or aerodynamic quality, a power roof ventilator could consume less energy than a more efficient centrifugal fan. The example shown here is roof top application with an operating point of 35,000 CFM at a quarter inch of static pressure.

And on the left, the roof propeller fan, which we refer to commonly as the power roof ventilator has a 54-inch axial propeller, consumes only 6.64 break horsepower, but it has an FEG grade that's relatively low, 57. And if that product was eliminated, for example, and you had to put a utility set or a centrifugal fan on the roof, one with an air foil wheel, that would require that centrifugal fan to be a size 49-inch wheel and consume 10.35 horsepower. Again, it's got a very high FEG value, but when those fans are applied at very pressures, you know, near a quarter of an inch, they consume more energy.

And then the other factors to look at, we talked about this just a littler earlier, look at the cost factor. The utility fan, even though much more efficient, costs 2.4 times as much and consumes more energy. And then there's the weight factor also.

Any questions on this slide?

MR. BROOKMAN: Question, yes, Alex Lekov, please. Right here.

MR. LEKOV: Alex Lekov, Lawrence Berkeley National Laboratory. So just wanted to understand that propeller fans are probably not comparable to the utility fans since those are in the unhoused product class as listed in this table compared to the housed. Therefore, they have different efficiency standards.

MR. KUSKI: Alex, there's also power roof ventilators that have centrifugal wheels in them and they perform a similar function. So if they were to go into a housed centrifugal category, the centrifugal power roof ventilators would probably be eliminated if a reasonable efficiency was set for like an air foil centrifugal.

We're saying the way the categories

are, whole product lines that do well at low pressure, could be eliminated if we're not careful.

MR. LEKOV: So my question is more specific. Propeller fans are unhoused fans, correct?

MR. KUSKI: Well, we have propeller fans that are just in a panel and we'd call that unhoused, but what would you call this fan here with a covering over the top of that? Is that housed or unhoused?

MR. LEKOV: Thank you.

MR. BROOKMAN: You could imagine the Department wants to establish not 100 of them and they want to have some -- they want to make sure that they are sort of indicative and sufficient to -- right -- to a majority of the uses out there can fit somehow, amicably, in there, right? Go ahead.

MR. HARTLEIN: This is Dan Hartlein, again, for AMCA. We're moving through a process here and we're going to get to a recommendation and category. We're just trying to do a little background data, so bear with us while we go through that.

MR. BROOKMAN: Betsy wants to comment here.

MS. KOHL: I've been discussing a little bit with Charlie here and we do look at utility impacts when we set standards and also equipment classes. So if there's some product utility or some feature that would counsel separating out that product class, like we don't want to have an unwieldy amount of them, but if there is some reason for a separate product class that would be good to provide in your comments.

MR. BROOKMAN: Okay, so we interrupted. Let's keep --

MR. KUSKI: And we're getting through that we will provide this in written comment.

MR. BROOKMAN: So keep going. You're doing well.

MR. KUSKI: I'm going to read through some of the changes we made. What you're looking at is a slide of our resulting recommended product classes. First of all, we start with the DOE recommendation and we divided centrifugal clean air housed into two categories. One was equipment class 3, housed centrifugal backward inclined and the other one was equipment class 4, housed centrifugal forward curved. So in essence, splitting this up would save that product called the forward curved fan which has a lot of good utility, low cost, low sound, low energy.

Second, we combined --

MR. BROOKMAN: Further differentiated what is characterized as housed or unhoused globally in there, right there.

MR. KUSKI: Yes, we do.

MR. BROOKMAN: Okay, keep going.

MR. KUSKI: We also combined centrifugal dust air housed and centrifugal material handling housed into one category.

That's equipment class 5. We called it housed centrifugal radial bladed. That's another class of fan with a different specific speed ratio, different application, high pressure, low flow.

The other thing, we eliminated the categories of blowers, both blowers axial and blowers centrifugal because we thought those types of products could be combined into other categories, namely the axial ones and the centrifugal ones.

We chose to eliminate safety fans and there was two of those, axial safety fans and centrifugal safety fans and we also chose to eliminate cross flow housed fans as a regulated category. Those fans, their usefulness and utility isn't well measured by fan efficiency, so we chose to leave them out.

We did add two categories of power roof ventilators, both the axial and the centrifugal. The axial do very well with nonducted inlets and outlets, of course. And the centrifugals do well if you have a short amount of inlet duct. For example, a grease exhaust application for a restaurant or any other -- a bathroom exhaust fan would be a good example, where a centrifugal exhaust fan is applied. And those would be classes 9 and 10.

And then we created separate classes for circulating fans and air curtains, classes 11 and 12, but we again, we feel those two should be exempt from this because their efficiency isn't a good measure of their value or their utility.

And that's all I have.

MR. BROOKMAN: Okay.

MR. LLENZA: This is Charles Llenza, the Department of Energy. Does this map at all with the European Union type applications or fan types?

MR. STEVENS: I don't know that offhand, but it's pretty close. The EU has much fewer categories than what we're proposing here.

MR. KUSKI: This is Tim from AMCA. The Europeans have only six categories, but they separate ducted and nonducted, so they essentially double, almost double those six categories. I think they end up with ten.

MR. LLENZA: So another thing to consider in your comments to the Department would be in this mapping that you're providing us, also to provide the test procedures that we should be using for each one of these and that helps us, you know, complete the cycle here for putting things together.

MR. STEVENS: Just a comment.

MR. BROOKMAN: This is Mark speaking.

MR. STEVENS: I'm sorry. This is Mark from AMCA, Mark Stevens. AMCA 210 would be used for all of those classes except for 7.

MR. BROOKMAN: So that's an interesting -- okay.

(Laughter.)

Keep going.

MR. KUSKI: Tim from AMCA again. And I forgot to mention we did add that induced flow category because there's a type of product out there used for laboratory fume exhaust applications and these are big fans and they use a lot of energy, but they develop a very high velocity of air at the outlet of these fans in an effort to induce more outside air to create a big momentum of air to carry a plume up high in the air and dilute it.

And you pay a penalty for accelerating that air which shows up as a reduced efficiency. So we thought it should have its own category and as Mark mentioned, the AMCA test standard developed for that is AMCA 260.

MR. BROOKMAN: I just want to finish this little comment, this segment with Michael and then I'm going to go Louis and Andrew. Louis, you're next.

MR. STARR: Would it be accurate to

say that you could associate a flow and static pressure for each one of these? In other words, a static pressure and a flow range that are optimal to use these particular fans like let's say you're doing a prop fan for a warehouse and you're trying to get air in and ventilating the house to have a very low static pressure and probably a fairly medium flow. And so it kind of based upon setting up certain parameters it would then define the class and then it would make certain -- in other words, a centrifugal fan wouldn't make sense in that application, right? It would actually be inefficient. So by setting up efficiency with given pressure and flow ranges, would that make a lot of sense for defining efficiency in those classes or not really?

MR. BROOKMAN: Dan.

MR. HARTLEIN: This is Dan Hartlein again. My answer to that would be yes and no. There are places where that's absolutely an accurate statement and would work. The range of application of house centrifugal, for example, is very, very broad. So the specific speed range across which people manufacture a centrifugal fan is tremendous. So there lies the complexity of what you said in that product, but in many of those products, I think you might be able to do some things there.

MR. STARR: And a follow-up question to that, splitting that between housed and unhoused centrifugal fans, what -- I missed -- what was -- why would you want an unhoused centrifugal fan? It seems like inherently that's going to help you direct your flow. Some of those efficiencies in terms of how flow comes in, is that more for applications that go in OEM equipment?

MR. KUSKI: Tim from AMCA. There has been a lot of change in the market to unhoused fans in the air handling marketplace. And they typically refer to them as plenum fans. And when you take the scroll or the housing off, you lose six or seven points of efficiency. However, you can really minimize the footprint of the air handler and they're concerned about the velocity profile that comes off of that fan and moves through a downstream coil. And this unhoused plenum fan has a very even velocity profile so then the coil efficiency downstream is improved. They can make a good argument for that type of product.

MR. STARR: So the other part, too, isn't the unhoused fan a little less expensive? I mean in other words, just the plenum fan. Also, the other part of that, too, is they're not getting their inlet conditions. In other words, their air handler or whatever, they're not getting the proper inlet conditions so the next best option to that is to have an unhoused situation where you just dump air into the side of your fan because you can't get the ductwork coming into the bottom. So it almost seems like it's one of those work arounds and applications. It's like it's a sub-optimal solution to a problem. It's like you're in a fix and then you're applying the solution to that application. Or is it more have real utility that's like this -- if I was designing it right I would do it this way?

MR. KUSKI: Tim from AMCA. You never want to mess with the inlet conditions. You don't want to bring in air at a right angle. However, on the outlet, with these plenum fans, they can choose to have air turn 90 degrees in that unit or if they build the unit big enough that air can go through in an axial direction. And that's the flexibility that a housed centrifugal would not offer them.

MR. BROOKMAN: Dan, go ahead.

MR. HARTLEIN: Dan Hartlein again. One of the additional things, we're talking about industrial fans as well. So there is a product that's a plug fan. And the plug fan is quite often designed into the furnace manufacturer's furnace as part of the process and in that scenario it's operating as an unhoused centrifugal fan and frankly, I'm not sure how you would house that centrifugal fan. So just as an example, there's a whole other range of products. And we have a comment.

MR. BROOKMAN: Please, find the microphone and add on -- and Andrew, you're next.

Your name, please?

MR. SREJOVIC: Zika Srejovic from Twin City Fan. And I've been in the industry for a long time and probably was one of the first people to introduce the unhoused plenum fans in air handling units back in the early '70s, and maybe late '60s. And the reason for that was really that it was a good compromise between lower efficiency forward curved fans and higher efficiency of the backward inclined housed fans. And yes, it is true that at a maximum efficiency the housed fan for the same size backward inclined is by five to six percent more efficient. However, somewhere in the mid-range of the performance curve they are about equal and as you get to the lower end of the curve, the unhoused fans can be even more efficient. So that was a good compromise between the fans with forward curved efficiency, perhaps in the high 50s and maybe 60 percent, and the other ones at 80 percent, so you end up with a 70, 72 percent unhoused fans as a good solution. And it was space saving for the air handling people particularly, and that became a very, very big market in the last 20 years.

MR. BROOKMAN: Okay, thank you. Andrew?

MR. deLASKI: I have a general question for Tim. First of all, I think that coming up with ten product classes is admirable. That's a manageable number in terms of that high-level comment.

The question I have for you is are there any -- if you think about the market, and I understand that your goal in developing the fan classes was to protect products that offer specific utility, offers specific function to marketplace.

The flip side of that is having classes where the classes serve the same utility, so as you look at these ten classes, where do you see that challenge arising the most? Are there classes here where you see the most overlap of application?

MR. KUSKI: Tim from AMCA. As you set and continue to set the bar on efficiency metrics in each of these categories, products will fall out of that on the market. Efficient products will fall out. And a good example of that is number 8, centrifugal in-line and mixed flow fans. And there's a very, very broad range of products that fit in the same space, a straight duct and they range from very inexpensive and very inefficient to very expensive and very efficient. Right away with this regulation, there would be whole product classes, for example, square in-line fans with no straightening vanes. That would be eliminated.

So I think there's -- am I misunderstanding your question, Andrew, or not?

MR. deLASKI: That's helpful. Of course, that all depends on where the standard shakes out and what makes sense for a standard. My question was are there classes in these ten classes that you're recommending for coverage by standards, are there classes where you see competition from one class to the other to meet the same market need?

I know it's going to happen some, but where is that happening the most?

MR. LLENZA: I think what he's referring to is do any of these classes of fans compete with each other in terms of being used in a market?

MR. BROOKMAN: Or in the same kind of application.

MR. LLENZA: Right.

MR. KUSKI: Yes, they do compete. The fan market is a messy market. There's a lot of products out there. You can put a vane axial fan or a mixed flow fan or a tube axial in the same piece of duct to do 5,000 CFM at an inch and a half. And your tradeoffs are price, efficiency, sound levels, physical size, that type of thing.

MR. deLASKI: A standard raises the bar for everything if you're not at the same level, but as you do that, as you have differential effects across these classes, you're going to have effects in the marketplace.

MR. KUSKI: Yes.

MR. BROOKMAN: Dan.

MR. HARTLEIN: I want to add a comment. Dan Hartlein, Twin City Fan representing AMCA here. You used the term protect the classes. I think we actually took this from a little different angle. And the angle we took was where can we set efficiency standards to avoid unintended consequences of this legislation?

So we took an approach that was different than trying to protect the class, but really look at where the products within these classes are performing a utility perhaps at the most efficient that we could imagine. Based on applying some of these other higher efficient products, we actually take -- we may have the unintended consequence of a higher energy use. So we spent a lot of time on this and it's, I think, quite well thought out and it was done for that reason more than to protect a particular class of fans, if you will.

MR. BROOKMAN: Good. Sanaee, looking at these classes and what they've presented here, do you have any questions for them?

MS. IYAMA: Not at this point.

MR. BROOKMAN: Not at this point. Okay, so let's go to 52, slide 52.

MR. LLENZA: I have a question.

MR. BROOKMAN: Charles Llenza, yes.

MR. LLENZA: These classes that they presented, does the technical team have any particular questions that the industry should be providing us in terms of data or reasoning or anything else like that?

MS. IYAMA: Definitely the reasoning behind why you think forward curved should be separated from backward inclined, etcetera. You explained that already, but giving us the details, the entire reasoning that led to those 10, 12 equipment classes will definitely be helpful. And the indication of overlapping utility, also.

MR. BROOKMAN: I guess each one of these classes would require something of a definition as well, right? Okay.

Detlef.

MR. WESTPHALEN: Detlef Westphalen, Navigant Consulting. I just have a question. A couple of the examples that you provided were like the power roof ventilator versus the centrifugal. If you provided the 15 percent maximum differential, would you run into those situations with that kind of a different, a very different picture? Would the 15 percent rule avoid those situations?

MR. KUSKI: Tim from AMCA. If you applied the 15 percent rule, you'd see those same type of variances that I showed you here. So you'd be able to go back and catalog data that you can get online. You'll be able to make similar selections to this.

MR. WESTPHALEN: Okay, thanks.

MR. BROOKMAN: Louis.

MR. STARR: So like a typical HVAC, I will say an air handler, but it could just be something where you're ducting air, you could in that case use a forward curved fan which are basically -- or an air foil fan which has blades that have less pressure drop or you could use a forward curved. The forward curved would be cheaper, but the air foil would be more efficient in doing it. So I think also in your selection curves you end up, it gives you, using Addendum U you have a wider range to select on a forward curved fan that's more efficient and a narrower range on the -- you have a wider range in air foil and a slimmer range in the other one.

But in terms of the price, it's still better if you're trying to do something less expensive, you probably would go with just the air foil in the same application. So you're not really necessarily the efficiency, if you split it up into a class, it's kind of what the overlapping of the utility. It seems like at least in that specific example there really is overlapping utility.

So when you have two classes that one is naturally a more efficient fan, it seems like there might be a problem in that area, but I mean I guess if there really is specific -- I know there are specific utility where you use a forward curved, but you would not use an air foil.

MR. KUSKI: Tim from AMCA. Yes, the main utility is compact size and low sound. You would end up putting a much, much bigger airfoil unit to deliver the same amount of air.

MR. BROOKMAN: We have a question from a person online. Danielle Fox writes, "could AMCA explain why unhoused axial fans are in the same class with tube axial fans?"

MR. KUSKI: Tim from AMCA. Good question, Danielle.

(Laughter.)

She found our weak spot.

MR. BROOKMAN: Danielle, thank you. Danielle Fox.

MR. LLENZA: Just to clarify, it's one of our technical team's parties in California.

MR. BROOKMAN: Okay.

MR. KUSKI: We argued long and hard where to put tube axial fans whether they should be up in the vane axial category or the panel fan category. Most vane axials are ducted and they're designed for high pressure. Tube axial fans are often ducted, but they're better at low pressures. So we could possibly have them up there.

The other thing, panel fans, if you had a nonducted sidewall application and you wanted to raise the efficiency some amount, you could drop a tube axial fan in there and you'd be in some length in there, but you'd get a few points of efficiency.

MR. HARTLEIN: I just want to add, Dan Hartlein again, that that debate that we had which was a long one on this, really kind of landed at the fact that in a vane axial fan vane, the turning vanes are there to efficiently redirect a swirl into an axial flow.

In the tube axial fan at such low pressures, the vane can actually become a pressure drop. And so the vane at those pressures can actually not accentuate efficiency, but it can actually cost you efficiency.

So that's kind of the basis for the ultimate decision to put it there because it's operating without the straightening vane section and at low pressures it will operate better than the fan with the straightening vane section.

MR. BROOKMAN: Okay.

MR. KUSKI: So Tim from AMCA, I just -- she hit us in a weak spot and there could conceivably, maybe someone could make arguments it should be in its own category, the tube axial fan.

MR. BROOKMAN: Okay. Louis, go ahead. I'm eager to move on here. Go ahead.

MR. STARR: Just one last thing, the circulation fans, where do exhaust fans for building a bathroom exhaust that type of thing, is that a circulation fan?

MR. STEVENS: This is Mark. Actually, it's a circulating fan. It's the fans that would be on your desktop or hanging from the ceiling.

MR. STARR: Okay.

MR. BROOKMAN: Let's go to Slide 52. Another thing the Department is always interested in is to ask industry and everyone for that matter this question about the technology options to improve efficiency. They're wanting to get your thoughts on not only what's here, what's possible and sort of trendline information as well. So maybe you could comment. I'm sure that's going to be in a comment box at some point there.

Slide 52 is this listing of technology options.

MS. IYAMA: Yes, there are some comments that I could read.

MR. BROOKMAN: So what do you

think? Gary, you want to start off? Please.

MR. FERNSTROM: I wanted to go back to air curtain fan.

(Laughter.)

And ask if the industry feels there's not an opportunity to improve these or why it thinks they should be exempted? Because we think there are a prevalent number of those and there is an efficiency improvement opportunity associated with them.

MR. BROOKMAN: Would someone define, so we're clear what they are? I think we know what they are.

Mark?

MR. STEVENS: Well, an air curtain is really a device that encloses a fan inside of it. And these fans that are inside are usually either forward curved or radial fans. So an air curtain would be mounted above a door to create somewhat of a partition when the door is open to keep material from going back and forth or across the door, to keep some sort of air conditioning barrier when the door is open.

Now why are we suggesting that they be not included? I'm the secretary for ISO Working Group 9 which is part of TC117. And this group is -- Working Group 9 is concerned with air curtains and what they're busy doing is developing a test standard on air curtain effectiveness. And it's not a measure of the efficiency of the unit itself, but how effective is that air curtain in its operation?

What they want to measure is the energy going into the air curtain, inclusive of the air conditioning required when air conditioning is operating versus the energy going into the air conditioning when the air curtain is not operating, and characterizing that or defining that as the effectiveness of the air curtain. So that, in their mind, is a better method of determining how well that air curtain is working.

MR. FERNSTROM: So if I could restate that your hypothesizing that a less efficient air curtain fan might actually improve the insulating effect and give you greater savings in building cooling or heating.

MR. STEVENS: This is Mark. Yes, that's very true. One of the characteristics of an air curtain is a uniform velocity profile at the exit plane of the air curtain. However, those fans that are used to give you that uniform plane are not very efficient of themselves, but they make the air curtain work better.

MR. FERNSTROM: Okay, I understand. Thank you.

MR. BROOKMAN: Dan.

MR. HARTLEIN: Dan Hartlein, again speaking for AMCA. I believe that the logic there and also for circulating fans was exactly the same. These are by fan standards relatively low efficient fans, but they are saving energy by their application. And a circulating fan allows somebody to turn the thermostat down in the winter or up in the summer and allows us to consume less energy by the fact that that product is used.

MR. LLENZA: This is Charles Llenza, Department of Energy. Those particular fans, for example, within that category could we not achieve maybe some kind of improvements in efficiency although different than maybe other categories? Could you still achieve efficiencies within that category?

MR. HARTLEIN: This is Mark again, it's possible, but again, if you -- what you're really aiming for is a uniform, high velocity profile out the exit plane of that air curtain. And that might mean that that is a terribly inefficient air curtain by itself, but it works great at its duty. So the answer is yes and no. The answer is maybe. There was a similar argument earlier on regarding the fans inside furnaces.

MR. BROOKMAN: Okay, thank you.

MR. FERNSTROM: So let me go to the air circulation fan. I think I understand the argument for the air curtain, but in my mind an air circulation fan might be a table top fan that you'd put in your house. Yes, or a ceiling fan. For sure, having that air movement maybe makes you feel cooler and might result in a need for less air conditioning energy use. However, that doesn't mean that that terribly inefficient table fan couldn't be made better and still serve the same purpose. So I kind of buy into the argument for the air curtain fan, but I'm having a little more trouble with the circulation fan.

MR. BROOKMAN: Michael.

MR. IVANOVICH: Michael Ivanovich, AMCA International. I think part of the issue is in terms of the scoping, going after which part of the market first or in phases. And I think the better emphasis of DOE is on the ten classes that AMCA is recommending.

MR. BROOKMAN: I want to shift, once again, to Slide 52 and hear from anybody about technology options that might be pursued to advance efficiency and trendlines also. That's also useful and important. Who wants to start? It might be useful to confirm this list.

Yes, please. It's Ethan?

MR. ROGERS: Yes, Ethan Rogers with ACEEE. One of the thoughts we had about any type of control technology is the inclusion of some type of feedback loop. There has to be a sensor, otherwise the variable speed drive is just an expensive drive with a parasitic load. So I think if you're going to include that in there, there has to be discussion of the fact that it's got some intelligence to it.

MR. BROOKMAN: Okay, thank you. Michael?

(Pause.)

Okay, then we're going to move on.

We're now getting behind.

Alex, find a microphone.

MR. LEKOV: Alex Lekov. Lawrence Berkeley National Laboratory. On second thought, I would like to return to the product classes to get the qualification on the radials fan product class which was identified in the original proposal of the, centrifugal fans was supposed to separate the radial tip bladed, radial and open panel versus the radial with the back plate. And the reason is the radial with the back plate are for -- our understanding based on the literature is for material handling. They have significantly lower efficiency.

So just to make sure that at least, maybe not now, but in your responses, to address the issue of possibility of radial with a back plate to be considered at the different efficiency. Thank you.

MR. BROOKMAN: Dan?

MR. HARTLEIN: Thank you for that.

There are some products, actually, that are made specifically for very heavy material handling. You might even call them material pumps. And in our industry those are often cast products that serve a very, very useful purpose. So your clarification is correct and we'll take that up in the written comments. Thank you.

MR. BROOKMAN: So the last I heard was no additional comment on the technology options at this point, so we're moving then to -- Sanaee, did we finish most of these comment boxes through this conversation? Effective different blade materials on efficiency. Compatibility issues, certain fans, VSDs, considering VSDs as a means to improve fan efficiency. We kind of touched on that.

Yes, Dan.

MR. HARTLEIN: This is Dan Hartlein, Twin City Fan and AMCA. There are some compatibility issues with -- or there are some design considerations and perhaps compatibility issues with variable frequency.

First, I'd like to clear up a position that we kind of put forward earlier. In the commercial industry, there are very few, if perhaps none, no variable speed drives sold, variable frequency drives sold with the fan. In the industrial market, it happens a little more often. So as we move into the industrial business, maybe 20 percent of the time that a VFD is applied it's purchased from the fan manufacturer. Just for information.

The second thing is that in designing for variable frequency operation, variable speed operation, several things have to be considered. One is that there is dynamic considerations for the rotor. And if we design the rotor to operate above what we consider first critical, that's a natural frequency where the fan gets excited and will frankly shake itself to death. Those offending frequencies in the operation range, you can't simply run every fan from zero speed to operating catalog speed. There are places where you have to take and program that out. So that's one clarification.

And another clarification we see this probably more in industrial fans than we do in commercial fans, but variable speed operation of a product not designed for it can lead to premature product failure. We have to consider the changes in speed on larger fans as start/stop cycles from a fatigue perspective. So there's a need to consider whether or not the application or the fan itself can handle the variable speed application from a structure and a strain in dynamic resonance perspective.

MR. BROOKMAN: Thank you.

MR. LLENZA: Charles Llenza, Department of Energy. Also, from a technical point of view the installation of VFD frequency drives, you know, my technical team looked at the details of improper installation of that particular issue. If that installation is not properly done also it could be counter productive to the equipment in terms of its lifespan and also efficiency levels.

If you could talk to a little bit about that maybe in your written comments, it would be appreciated.

MR. HARTLEIN: Sure, and I'm happy to and prepared to make a brief comment now. Bearing currents, you can actually lead to stray bearings, stray currents grounding through bearings which shortens life drastically.

The other comment I would make in variable frequency drives is that our motor suppliers have been moving on what is required in the motor to operate with the variable frequency drives. So that's a moving and evolving standard in and of itself and that's what product that the motor manufacturers are putting in the market that's capable of running with a variable frequency drive.

What we would have done or what the motor people would have sold us compatible for a VFD six years ago is no longer offered compatible with a VFD. So that's evolving as well. So a side comment to that complexity.

MR. BROOKMAN: Rob?

MR. BOTELER: Rob Boteler. Just to pick up on that. The motors today all have insulated bearings because of the shaft currents in the fan. You end up with the same issue with shaft currents. So I'm sure they'd have to take a look at that and probably add that to the fans.

MR. BROOKMAN: Steve?

MR. ROSENSTOCK: Steve Rosenstock. On Item 5-18, different blade materials on efficiency, you're asking for like metallurgical or different chemical or plastic kind of -- that type of information in terms of its impact on the efficiency of the fan or the motor or the VSD?

MS. IYAMA: I believe it's the

impact of using different blade material on the efficiency of the fan.

MR. ROSENSTOCK: And again, Steve Rosenstock, so yes, you're talking about the actual metallic or plastic compounds or mixtures that are being used for the blades and what -- if they're having any impact?

MR. BROOKMAN: Charles Llenza.

MR. LLENZA: Yes, plastic, aluminum, different kind of materials. It also could be a coating. It doesn't necessarily have to be the actual material of the blade, but it could be a coating for a particular use that these fans may have.

MR. BROOKMAN: Louis.

MR. STARR: Just to note, too, on the utility of having a VFD with a fan is also getting it right size for the application. As things change in a factory and you need to adjust things up and down, and that VFD is beneficial even if you do maybe lose fan efficiency off your best efficiency point.

And then in terms of technology, another thing I think they're working on is they're working on the ability to adjust the VFD, the reactive power between the motor and the VFD which can get out of whack. And there is some technology in that area such that you don't have as much losses in your VFDs and between your motors and VFDs and some other things in that which is something that is kind of evolving now. It is kind of some new technology that seems to be coming up.

MR. BROOKMAN: So I'm eager for us to pick up the pace here a little bit. The content has been excellent and we're kind of commenting, I think, mostly at the appropriate level, but we've got much more ground to cover here. So we're going to press ahead here.

MS. IYAMA: So I'll move on to the next chapter which is the screening analysis. So for the screening analysis DOE will take the technology options that we identified in the Market and Technology Assessment and we'll screen out several of them based on the four following criteria: technological feasibility; practicability to manufacture, install, and service; impacts on product utility or availability to consumers; and impact on health and safety.

The remaining technology options are referred to as design options are then fed into the engineering analysis. And here we have a comment box. On the screening analysis, are there any technologies that DOE should not consider because of any of the four screening criteria? If so, which screening criteria apply to the cited technology options?

MR. BROOKMAN: No comment at this time? No comment at this time.

Thoughts? Steve Rosenstock.

MR. ROSENSTOCK: Just one quick thought. Steve Rosenstock. Yes, after seeing the issue with fluorescent lamps and the rare earth material issue and supplies, you were talking about blade materials and I think if there's -- and again, I don't know the technology specifically, but if there's some sort of technology that totally relies on rare earth materials for improved efficiency, I think at some point in the preliminary analysis that you might -- you know, if there's availability issues that should be accounted for. And you maybe might want to screen that out just because of possibility of impact on the market.

MR. BROOKMAN: We're moving on.

MS. IYAMA: So next I'll let Sam present the engineering analysis.

MR. JASINSKI: Thanks, Sanaee. My name is Sam Jasinski from Navigant Consulting. Today, I'll be discussing the methodologies that the Department of Energy uses to conduct the engineering analysis.

The purpose of the engineering analysis is to characterize the relationship between manufacturer's selling price and improvements in energy efficiency. So the outcome will be cost efficiency curves for each equipment class similar to the one that you see on the left. Just make a note that this is a stylized version. It's not based on any data. This is just to show what the expected trend would look like. And these cost efficiency curves are then used in downstream analyses like the LCC and payback period analysis, manufacturer impact analysis and employment impact analysis.

As we've discussed earlier today, DOE recognizes that the equipment classes identified by DOE cover a large range of fan designs and even within certain fan types, a large range of fan sizes. So to address this, DOE may consider focusing its analysis on a subset of representative equipment classes, so maybe a subset of the total equipment classes and then even within it a representative equipment class, representative units within that class.

In the essence of time, I won't read these directly and I think 7-1 there provides some spoilers for some upcoming material that I'll go through. It essentially lays out the methodology that DOE uses for the engineering analysis and there will be an opportunity to comment on those specifics probably a little bit later.

I think the important one here is asking manufacturers to provide comment or other interested parties on the methods that are used to improve the efficiency of fans currently. I think this is very much related to the technology option discussion that we had. So I don't know if anybody has anything additional to add to that.

MR. BROOKMAN: Additional comments? Yes, Mark.

MR. BUBLITZ: This is Mark Bublitz from New York Blower Company representing AMCA. It's a complicated issue and I think we agree to submit written comments in that regard. Your broad categories are sufficient enough, but we prefer the written approach.

MR. BROOKMAN: Okay, yes, Dan.

MR. HARTLEIN: I know you talked about 7-1 being clear as we go here, but I do want to add a thought that within those equipment classes, we see the fan industry as a pretty mature industry. And the expectation within those classes of finding huge leaps forward in efficiency, I think they're not there.

I want to reiterate again the comment we made earlier that probably the greatest gain is in proper selection and application.

MR. JASINSKI: Thank you. Some of the data sources --

MR. STEVENS: Excuse me. This is Mark from AMCA. 7-3, we did have a comment

MR. BROOKMAN: Please, Mark.

MR. STEVENS: The question was on scaling, of course. I'm sure you're familiar by now with the fan laws and that's used pretty widely throughout the industry. You're also familiar with the AMCA Certified Ratings Program, I'm sure. As I mentioned earlier the fan laws are used, are allowed to be used within the Certified Ratings Program, but licensees or participants may only rate upward, if the fans are geometrically proportional. So we assume that's what you meant by scaling.

The second thing was is that it's very difficult, impossible, to scale wire to gas, so we just wanted to have you keep that in mind.

MR. JASINSKI: Yes, I was going to touch on this later. There's a slide about picking the units and scaling. I actually had the chance to sit on the SPC 210 meeting where they were discussing this issue about how the fan efficiency laws don't necessarily apply when you're considering a scope that includes motor or VFD or VSD efficiency as well. So if there's been any progress on characterizing how those things impact the scaling methods that are currently used, that would be very helpful for DOE if you could provide that in written comments.

MR. BROOKMAN: Okay. Thanks.

MR. JASINSKI: So some of the data sources that DOE will use for the engineering analysis, any publicly-available data from manufacturer websites or equipment literature such as catalogs will be included. Some additional data sources we'll get into later when we start to interview manufacturers under nondisclosure agreements and things of that nature. So at this time, if there is any data that anyone would like to provide --

MR. BROOKMAN: AMCA said that they would come forward with data and you have the interviews following that.

MR. JASINSKI: Great. This graphic gives a better idea of the process that DOE goes through to develop the cost efficiency curves that I mentioned earlier. To begin with, DOE defines baseline models and the baseline basically determines the characteristics of common or typical models that serve as reference points to assess the changes due to energy conversation standards, so implementation of technology options or any technology or design change that might improve efficiency.

Next DOE does reverse engineering and there's sort of a two-pronged approach here on the evaluation of performance or efficiency side, DOE will gather test data available or existing test data or conduct tests to verify efficiency ratings. And then on the cost side, DOE will perform tear-downs and use the inputs from the teardowns into a cost model to generate estimated manufacturer production costs and then manufacturer selling price at these efficiency levels.

In addition to the reverse engineering, as I mentioned earlier, there is extensive data collection and interview process where DOE will interview manufacturers and collect manufacturer data on costs and efficiency and those interviews will also help DOE understand those and later on I'll discuss how those interviews are also used to evaluate the impact on manufacturers of potential standards.

And finally, developing the curves, DOE uses those inputs to create those cost curves that characterize manufacturer selling price as a function of efficiency.

This graphic gets a little bit more detailed about the reverse engineering process. First DOE selects units and this goes back to talking about selecting representative units. Typically, the criteria that DOE will use are to try to get a good subset of the currently available market. It will focus on equipment classes that have a large number of shipments. Within each equipment class, DOE will target manufacturers, many manufacturers, often focusing on those that have large market shares and even within a certain fan type or model, try to get a series, a full series of models to assess the different design options or technologies that might impact. And also size in this particular case will come into play.

So then once DOE selects the units, then we'll conduct the physical teardowns in which DOE actually takes apart each piece of equipment and enters into a bill of materials, information such as the material type, the number, weight, size. And typically materials can be categorized into two different categories: fabricated parts, which are parts that are made in-house by the fan manufacturer, and then those that are purchased parts that are supplied. And those are treated somewhat differently. And then each of those DOE inputs what the expected assembly process for each of those is and then ultimately that bill of materials is entered into the manufacturer cost model and it uses that input to estimate manufacturer production costs.

MR. BROOKMAN: Rob.

MR. BOTELER: When you look at -- Rob Boteler -- when you look at the selection of units, are you thinking that you would do a teardown for each one of the equipment classes? I mean we suggested 10, possibly 12, equipment classes. That's a huge number. I mean with motors we did three units per equipment class I guess we would say.

MR. JASINSKI: I think DOE would attempt to include at least one unit from each equipment class, especially if the different, the reasons for differentiating those product or equipment class, excuse me, are so heavily related to performance.

Some of the discussions we had are that they're very heavily application based and those applications dictate performance.

So unless the piece of equipment is very similar or there are cases where DOE will do what's called a virtual teardown, if there are enough similarities between two, and DOE can gather enough information about what those differences are and adequately estimate the materials, assembly process cost, then it will use maybe a full teardown from one equipment class and then conduct a virtual teardown based on public information for an additional equipment class. But in general, yes, DOE would attempt to tear down, at least one from each equipment class.

MR. BROOKMAN: Michael.

MR. IVANOVICH: Quick question, if DOE were to receive the extended product approach, would you be tearing down the VFDs in the motors as well?

MR. JASINSKI: The VFDs in the motors would be included in the cost model, but most likely as a purchased part because as you're saying they're not manufactured or fabricated by the fan manufacturer.

MR. BROOKMAN: Is it Greg?

MR. WAGNER: Yes, Greg Wagner. Within each product category, there's a wide range. We just earlier talked about input power from I believe it was 125 to 500,000 watts. I saw a price on there of somewhere in the neighborhood of $50,000 or something for a fan. We don't have anything that sells for let's say one thousandth of that. How do you do a teardown in one category, one product to cover that span, if you will, and have anything that's meaningful?

MR. JASINSKI: That's a good question and it's one that I'm going to ask you in about two slides.

(Laughter.)

But like I said, one approach when dealing with a broad scope like this that includes a lot of different fan types and sizes is to select representative units and then use scaling techniques to use the information from directly analyzed representative units to apply to larger sizes and even in some cases other types of equipment.

MR. BROOKMAN: Dan, you want to comment here?

MR. HARTLEIN: Just a comment on construction. You grab the smallest fan of one of these classes and the demands, the physical demands, the dynamic stresses are infinitely different than when you get to the larger size in the same class. So that scaling becomes really, really difficult to do.

MR. BROOKMAN: Rob.

MR. BOTELER: Being experienced in the scaling community, this is probably one of the most scary things for manufacturers is the scaling for all the reasons that we've just heard. It's the area in my experience that is the only thing that ever got us to a lawsuit was the fact that we had issues with scaling that weren't addressed by the Department.

MR. BROOKMAN: Thank you, that's perspective. That's useful.

MR. JASINSKI: If you could identify those pitfalls in the written comments so that we can try to do our best to avoid them, that would be very helpful.

MR. BROOKMAN: So do we have a comment box?

MR. JASINSKI: Yes.

MR. BROOKMAN: Summarize this for us.

MR. JASINSKI: Okay, so this is essentially just asking for detailed data about performance and incremental costs of achieving higher efficiency. So you know, total incremental cost, incremental cost broken out into certain material costs, labor costs and so forth, any data is welcome and very much appreciated.

MR. BROOKMAN: Yes, welcome. Your name for the record.

MR. DORIA: Yes, Jordan Doria with Ingersoll Rand. I'm here on behalf of our Trane business, heating and air conditioning. I'm not sure the most appropriate place to ask this question, but I think it's here as we're starting to get into the question of who bears the cost. It seems like there's three sort of broad categories. There's costs to the customer. There's costs to the manufacturer, the fan manufacturer. And then there's impact on energy costs.

I think that's an appropriate methodology when we're talking about finished products that are being delivered to the end user, but here as we're often talking about essentially a component in certain applications, it seems like a missing element of analysis is what the impact on costs could be for those charged like in the heating and air conditioning industry, putting it in a certain application. And I can see getting into a chicken or the egg thing here, but depending on what the efficiency standards could ultimately be, that could have a dramatic impact in terms of costs for redesign for manufacturers and others who are using them in applications.

So my question really is at any point in this process, are you seeking to try and capture those -- call them downstream or sort of ripple-effect costs that others would bear?

MR. JASINSKI: Sure. A lot of the issues that you talk about are picked up in some of the downstream analyses. For instance, we're going to get into making sure we know the distribution channels, the markups at each stage of that distribution channel and then ultimately the life-cycle cost assessment will account for those issues.

MR. DORIA: Okay, thank you. Gary.

MR. FERNSTROM: Gary Fernstrom. When you do this analysis and assess the costs associated with materials, labor and so on, do you use the near-term cost or the mature market cost, that is, how do you account for the potential reduction in the these costs over time as the production of products increases?

MR. JASINSKI: Sure. DOE does not project future costs for things like -- for materials, for instance, DOE uses a five-year average using -- a five-year average for things like copper, steel, things like that from the Bureau of Labor Statistics.

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock, EEI. A follow up question. For commodity products like that, I can understand that costing methodology, but drives, for example, the cost may decrease as the demand for those products increases in the future. So do you make any allowance for that?

MR. JASINSKI: No, in the engineering analysis we try to use current prices.

MR. LLENZA: This is Charles Llenza for the Department. We like to use real numbers, so if you had contracts that showed that the cost was being driven down, contracts -- two, three-year out contracts like in the case of LED lighting for certain applications, we had information to that nature that the cost of that particular item was going down. We could use that. But we cannot use pure projections. In other words, we could not take five-year information and project out say if it was a curve that was slanting downward, we couldn't take the endpoints of that curve five years out. It's just not something we can do.

MR. FERNSTROM: Thank you.

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock. Yes, under the -- I'll say the extended regulatory regime where you're looking at the motors and the variable speed drives and any other controls that might be used, it also comes down to a -- there's a lot of information you're trying to gather and I know you do a very good job doing it, but in terms of this effort, are you going to have the resources, not only interview the fan manufacturers to get some of that information, but also the motor manufacturers because their products' prices are also going to be influenced and the drive manufacturers and all the other controls that are out there that haven't even been discussed that could be part of these systems.

You could be talking to let's say at least 20 fan manufacturers, 10 motor manufacturers, I don't know how many drive manufacturers and then all the other control manufacturers. But they all could be part of those system costs. Does -- are the resources there to do it?

MR. JASINSKI: When scheduling interviews, DOE will prioritize the manufacturers that will be subject to the burden of the standard. However, there have been instances in past rulemakings where to a certain degree some component suppliers were also involved in the interview process.

MR. LLENZA: Charles Llenza from the Department of Energy. We also have a database or experience in like the motor manufacturers and other components of this. I mean this has come up in other rulemakings, so we do have knowledge of the industry. And where we don't have knowledge I think we make the effort to go out there, make sure that we're covering hopefully a good population size of a particularly new technology if that arises.

MR. BROOKMAN: Let's move on to manufacturer's selling price.

MR. JASINSKI: So DOE will also develop estimates for manufacturer's selling price and this is essentially just applying a markup to account for nonproduction costs such as maintenance, depreciation, SG&A, R&D in some cases and DOE intends to estimate the manufacturer markups based on publicly-available financial information such as SEC 10Ks and so forth. So I think at this point DOE would like comments on that methodology or any data information about what that potential markup should be.

MR. BROOKMAN: Any comments at this point on this method? No? No comments. Okay. Michael?

MR. IVANOVICH: We're going to respond to these things when we can, but we just can't give out pricing information just yet.

MR. JASINSKI: Sure, that's something that is probably more appropriate during the manufacturer interviews and when NDA is in place. DOE recognizes that so we appreciate that.

Next, DOE typically does not include conversion costs in the engineering analysis. Usually, this is something that's evaluated for the manufacturer impact analysis, but the conversion cost just quickly includes investments that might be required to build production facilities for higher efficiency designs and so forth. This is something that gets more into the manufacturer impact analysis which we'll touch on later.

And just like anything else, this is one of those cost categories where DOE would typically request data which is usually provided under NDA when we do manufacturer interviews.

So I think we've already talked about this a lot in terms of DOE's potential approach to select representative units and then scale results. As I mentioned earlier, within each representative equipment class DOE would select representative fan units in size ranges and specific speed values that have a large number of models. But DOE would plan to evaluate fans across the range of sizes for at least one fan series or more to determine a size efficiency relationship and then use that relationship to scale its results for representative units to smaller or larger units.

And we've already touched on these. DOE is essentially asking for feedback and guidance on how to do that appropriately.

MR. BROOKMAN: Yes, Mark.

MR. BUBLITZ: Mark Bublitz, New York Blower Company representing AMCA. We just encourage DOE, a significant portion of the fan products are not manufactured to inventory. So the term "readily available" is repeated in the framework often. A good chunk of the market, you just can't go find it in a warehouse. It's manufactured to order. So we've encouraged you to sample, get an appropriate sampling technology.

MR. JASINSKI: Thank you. As I mentioned earlier, the first step is to identify baseline models. Typically, DOE selects baseline models -- a baseline model for DOE would be one that just meets the previous standard. In this case, there aren't any current standards so DOE would select baseline models that are typical of the least efficient models that have a large number of shipments. DOE requests comment on that approach.

MR. BROOKMAN: Yes, Michael.

MR. IVANOVICH: With respect to an extended product approach on that, how would you begin to develop a package? How would you select a VFD or a motor to go with a fan?

MR. JASINSKI: Well, I think it would be slightly different from the different regimes that we identified. I think under regime number 2, if I'm not mistaken, where the classes are divided by whether or not there is a VSD, essentially it would be similar. I don't believe that there are current efficiency standards for VFDs or VSDs, so it would be a similar approach, select the least efficient.

Under regime number 3 -- where VFDs or VSDs are essentially treated as a design option. In those cases the VSD, if they are proved to be much more efficient, they probably would not be included in the baseline. So the baseline would be a piece of equipment that does not use a VSD or a VFD.

MR. IVANOVICH: I think part of the concern or the inquiry is that whether the standards use a very wide variety in performance, you know, of those types of equipment and how do we match them up. We'd be interested in hearing more about that.

MR. JASINSKI: Sure.

MR. LLENZA: We're trying not to necessarily narrow down the options of the manufacturers and the customers. So in doing these rulemakings, when we start defining categories of equipment or groupings, classes, what we call classes, we try not to make it such that it's narrowed down to one specific technology or one piece of equipment. We rather broaden it where we can. In the case of the VSD and the VFD, we would probably more talk about controls and then within that box of controls, we would give you options of choices of things that the manufacturers or the people that are ordering the equipment could do to achieve the same level of efficiency when you use those combinations.

So this is an abstract, what we're trying to do. It may not show on the surface, but what we try not to give you -- we don't try to tell you what equipment to use and how to match it up to achieve those efficiencies. We try to provide you as much flexibility as possible.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock. In terms of baselines, I think in terms of -- especially for your modeling, that if -- again, under the extended regime, if you're talking about the motors that are already covered DOE products that the efficiency levels should be assumed to meet the 2010 or upcoming 2015 minimum efficiency standards that are separately regulated by DOE. I'll say for the covered motors.

Also, I think in terms of your baseline that you should look at Chapter 6.4 and 6.5 of ASHRAE 90.1, use the 2010 standard now or the 2013 standard which will be published by October of this year, I believe, which has significant energy conservation requirements for specific fans, i.e., VAV fans, if they're 10 horsepower or larger. In 2010, they have to have some sort of control device to limit their usage of energy at part loads. 2013, we'll have more, I believe, more, obviously more requirements including fan efficiency grade. That should be considered part of the baseline and I think that's very important because especially after DOE does its determination, the states update their standards to 2013, those will be the new minimums throughout the land. Thank you.

MR. BROOKMAN: Thank you. Rob.

MR. BOTELER: Just to comment, Rob Boteler, just to comment on Steve's point on motors. We have a rulemaking in process right now. We're moving to include all the definite and special purpose and other categories of motors which essentially anything we see here with fans would then have a covered product and it would be at the higher NEMA premium 1212 level.

MR. BROOKMAN: Michael? Okay.

MR. JASINSKI: After establishing the baseline, DOE will then establish intermediate efficiency levels so within a given size selected for analysis, the fan models for which performance data is available, that performance data will be assessed to determine those intermediate levels of efficiency. So DOE requests comment on that approach.

MR. BROOKMAN: Any comments here? Yes, Mark.

MR. BUBLITZ: Mark Bublitz, New York Blower Company representing AMCA. Can you clarify, it just sounds a little circular, we're going to use --

MR. JASINSKI: Sure. Essentially, that would be data availability is big here, whether there's published data in product literature, DOE can use that and identify efficiency levels of -- levels of efficiency at which there are models and compare that grouping of efficiency. It's basically assessing the span of efficiency available on the market compared to back to that baseline.

So I'm hearing things like these other standards that -- or building codes that might drive efficiency. There might be an efficiency level where a lot of fans are meeting a certain level from maybe ASHRAE 90.1 that are above the baseline that we identify and that would be an efficiency level. Or the FEGs, for example. You see FEG 55, 65, 85. It would be similar, do something similar based on whatever efficiency metric that DOE decides to use with its test procedure. It would just essentially be identifying those levels using that efficiency metric.

MR. BROOKMAN: Okay.

MR. BUBLITZ: How else would you do it?

(Laughter.)

MR. BROOKMAN: Okay.

MR. JASINSKI: And I essentially explained this in my answer. So DOE requests comments on what the available range of efficiency is. And if they don't, whether or not manufacturers offer fans that have varying efficiencies at different duty cycles or utility.

MR. LLENZA: This is Charles Llenza, Department of Energy also. And you know, if we know of any ENERGY STAR requirements for fans, this is a good time to bring it in to make us aware of that, too.

MR. BROOKMAN: Do we have any

comments here?

MR. JASINSKI: I think we had one here.

MR. BROOKMAN: Yes, I'm sorry. Tim.

MR. KUSKI: Tim with AMCA. I'm still struggling with what is meant by Question 7-14.

MR. JASINSKI: An answer might be that within one of the proposed equipment classes that you identified, you can say that there are fans that have range in FEG from 55 to 85 or what typical -- the typical span of efficiency might be within a given equipment class.

MR. KUSKI: Our fan performance is already publicly available and has third party endorsement by AMCA. I'm confused. I think that information is already there that you can get at. Am I missing something?

MR. LLENZA: This is Charles Llenza from the Department. Just make sure you point at it so that we don't miss it.

(Laughter.)

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock. Again, under one of the potential regulatory regimes where you're looking at other controls, variable speed drives, step controls, etcetera, I'm just thinking about other controls for other technologies. I'm not personally and if there is something out there, forgive me, I'm not familiar with an efficiency metric for variable speed drive, the drive itself. So I don't know how you say quote varying levels of efficiency for -- or any other control when it's really the focus is the energy saved by the product that it's controlling. But they will use energy. I mean there's energy used by the drives and other controls and that will vary by the type of control, but I don't know of specific efficiency metrics that can be I'll say added on to or included in with this.

MR. JASINSKI: Right. Under that regime, the ultimate goal for DOE would be to assess the range of efficiency of the fan still, not necessarily to VFD. If that information is available for the VFD and that enables DOE to then estimate the efficiency range of the fans, then it would be useful.

MR. BROOKMAN: Charles.

MR. LLENZA: Yes, I just want to refocus as you stated. We're not really after VSD or VFD efficiency. We're really after fan efficiency. So the metric for efficiency levels of the components is not really the question. It's really as the system, right? The system approach to those.

MR. BROOKMAN: Question or comment here, please.

MR. SMITH: Yes, Wade Smith with AMCA. So AMCA runs a 40,000 square foot laboratory. It's accredited and we do third party certification of ratings. And all of our member companies who certify the ratings of their products publish those ratings in such a way that the fan efficiency grade, the efficiency at all operating points is in the public domain and it's correct.

One of the troubling aspects of the idea of an extended product ruling is that the performance of motors at part load and heavy motor applied to a large fan operates at part load when the fan is at full load, so we don't know what the motor performance is at part load. We don't know what the variable speed drive performance is at full or part load. And so you know, what happened in Europe with 12759 is that they fell back upon an assumption about those losses associated with those components.

And so it's quite possible to calculate the efficiency of an assembly of these three components based on an estimate of the drive and motor losses, but then what you have at the end of the day is an estimate of the performance of the package. So in our world, we don't deal with estimates. We deal with precision. And in the regulatory world, generally, a published performance level is expected to be achieved. And the test on that ultimately is to take the assembled, in this case, extended product and test it to see if the representation of performance is, in fact, correct.

But we don't have a correct representation of the performance at any operating point and that's the discomfort associated with all this. And then when we talk about well, we want to break down the product, but we don't need to break down the drive. It feels foreign to our member companies to be placed in a regulatory chain of command, to ask us to embrace products which we didn't design, we don't manufacture, we don't understand, and for the most part don't sell.

That said, they save a lot of energy or have that potential. Let's say it that way. They have that potential to save a lot of energy, but the standards aren't written. We heard a moment ago about changes that are happening in variable speed drives to deal with some of the issues that have happened in the early ones of motors which were authorized for use with variable speed drive six years ago, but today are not authorized for use because problems have arisen that we didn't know about previously. This is a very, very young emerging and very exciting aspect of our industry, but it's a little young -- it's so different than a mature fan industry where you can tear apart and you can deal with and you can find that last two or three percent and we're ready for that.

MR. BROOKMAN: Gary.

MR. FERNSTROM: Gary Fernstrom. I totally understand that point of view, but being new to this discussion, I'd like to ask doesn't anybody make an integrated air handling device that consists of a fan, a motor, and a drive that might be used in a commercial HVAC system?

MR. JASINSKI: Yes.

MR. FERNSTROM: Somebody does make that product. Okay, so let me follow on and say why should it not be possible to measure the air out and the electricity in in which case you would capture the whole efficiency of this product at whatever operating points you wanted to measure it at. That doesn't seem like such an impossible task to me.

MR. BROOKMAN: Your name, please?

MR. HAUER: My name is Armin Hauer of ebm-papst. Yes, this type of air mover exists. It's available like an ECM type of series of products. It's available as complete air mover. It's available in American market today up to 6kW electrical input. And developments are going to 12kW electrical input. These products indeed can only be measured wire to air because they're completely inseparable. So you cannot separate the variable speed drive from the motor and not from the fan.

So these products they have truly wire to air ratio and there is no ambiguity about influences that can happen in the field if maybe an electrical filter is applied or not applied or if the variable speed drive settings are changed. If you change the PWM frequency or something like you can do with a standard drive, then you can change the efficiency of the system, but these completely integrated air movers would not have that ambiguity. Thank you.

MR. FERNSTROM: So Gary Fernstrom again. I totally understand the issues you guys are raising with respect to large equipment, where you couple a fan of some kind and a motor and maybe a belt drive and somebody puts a VSD on it and you don't make it and it's not integrated. But when we talk about this extended product category thing, I'm talking about the smaller product that is sold as a package and can be measured and there ought not to be a big concern about this.

MR. BROOKMAN: Yes, Dan.

MR. HARTLEIN: Dan Hartlein, speaking on behalf of AMCA. Let's not forget that we started the discussion with a product range to begin at five horsepower. And as our colleague from ebm-papst just represented, he's at five kilowatts for his product range at this point in time or maybe you said six, I'm sorry.

MR. FERNSTROM: But that's an upper limit though, but go ahead.

MR. HARTLEIN: No, that's the lower limit and he's at six kilowatts with his product range at the top. So there's a very, very small amount of his product that would even fall into the definition of this discussion as to where we are today.

MR. FERNSTROM: Okay, so we opened

by saying we want a broader range than you do. We want to go with what DOE's original proposal was which includes a lot of this smaller equipment that you all said was made by small manufacturers and would represent a significant burden on them to include this product. And Andrew said we ought to take a look at that. We ought to see how much of the market energy use that comprises and whether or not it makes sense to regulate that.

MR. BROOKMAN: Okay, final comments on these comment boxes on 76. I'm not sure we've touched on these, really. Maybe we have.

MR. ROY: Doug, I have a comment.

MR. BROOKMAN: Yes, please.

MR. ROY: My name is Aniruddh Roy. I just wanted to comment on Steve Rosenstock's and Wade Smith's comments. There is an existing standard, AHRI 1210. It's a performance standard for variable frequency drives. And there's a rating metric in that standard drive system efficiency which is out there.

We don't have a position on the regulatory regime yet, but if DOE were to go in the direction of fans inclusive of the motor and VSDs, I guess AMCA 210 and the standard come to mind in terms of the consideration.

MR. BROOKMAN: Thank you. Louis.

MR. STARR: So I may have a solution for some of the problems that we're talking about. One thing, since the motors are not clearly understood of how they perform other than just full load performance in VFDs as well, perhaps a factor could be entered for those items that are applied equivalently across the fans. And so really all then you would be tested on is your fan application. The rest could be calculated. If that could be put in the context of the regimen of the federal standards, then there wouldn't be a problem. But I'm not sure that that can happen. If it can happen, then that would be a solution.

MR. BROOKMAN: Okay. Let's finish with the engineering analysis.

MR. JASINSKI: Sure.

MR. BROOKMAN: And then we're going to head to break here shortly.

MR. JASINSKI: So ultimately the intermediate efficiency levels end at what DOE calls the maximum technology and DOE is required to analyze the maximum technologically feasible efficiency levels. So DOE will seek interested party input on the appropriate max. tech. levels. This is essentially asking what is the highest achievable efficiency for fans in each of these equipment classes.

MR. STEVENS: Doug, I just have got to return to the last comment. I apologize.

MR. BROOKMAN: Sure.

MR. STEVENS: I wanted to reiterate that AMCA has a task force, an international task force that's working on the very things we were talking about last and that they're looking at an FEG metric, a measure wire to gas metric for the type of fans that Armin was discussing. And then for other products where the permutations are very complex and there's too many, that it's going to be an FEG metric with estimates for losses to motors, drives, et cetera added on top of that. I just wanted to reiterate that. We understand that complexity and we're working on it.

MR. BROOKMAN: Where are you in the progression of that work?

MR. STEVENS: That's a good question. The FEGs are complete. The wire to gas testing is for the most part done. There's some tweaks to AMCA 210 that have to be made to close a gap, but that's not very difficult to do so that's an ASHRAE process. So we're a bit of a slave to that timing.

The third one, the measured part, we've had two meetings already. The way forward, the proposed way forward has been agreed upon by the task force. They've been tasked by the AMCA Board of Directors to finish by May of this year. I think that's pretty aggressive, but we think it ought to be done this calendar year.

MR. BROOKMAN: Okay, good.

MR. JASINSKI: Any comments on the maximum technology level?

MR. BROOKMAN: Yes, Dan.

MR. HARTLEIN: Just to reiterate a comment, Dan Hartlein, Twin City Fan and AMCA. To reiterate a comment I made earlier that the industry is pretty mature and we've been working towards efficient designs for years. My colleague, Mr. Srejovic, talked about the evolution of the plenum fan earlier and how that actually led to a more efficient solution for the user of the product, so I think we're close there. And again, the concept of getting the right fan size selected for the right application is where we believe the largest pickups are.

MR. BROOKMAN: Okay. Then let's move on to outside regulatory changes.

MR. JASINSKI: So DOE will also consider outside regulatory changes in its analysis. This is essentially saying that DOE will consider the effects of other DOE energy conservation standards and any regulatory changes outside of DOE's rulemaking process that might impact manufacturers of this equipment.

We also -- DOE also understands that some regulatory changes can affect the efficiency or energy consumption of fans covered under this rulemaking so it will account for that. And DOE will attempt to identify any outside engineering issues that might impact its analysis for the engineering analysis.

MR. LLENZA: This is Charles Llenza. That includes ASHRAE.

MR. BROOKMAN: So outside

regulatory changes that you anticipate? Dan.

MR. HARTLEIN: Dan Hartlein. Twin City Fan and AMCA. I have a short story to tell and I think it kind of demonstrates where there might be some issues here. This is a very recent story. It happened in the last two weeks. We have a customer who is operating a paper mill. He has a fan which is operating within the range that we're considering here, under the 500 kilowatt range. We have a proposed solution to this customer to cut the consumed power in half, literally a little more than that in doing a retrofit. That retrofit has been stopped because of the potential or the interpretation by the customer in their environmental side that this could trigger new source standards for the boiler that this fan is operating on.

I have now seen this twice. Another one is a quarter of a million dollar retrofit that's sitting in a South Carolina power plant basement, has never been installed for the exact same reason.

So I think there may be some crossover between the Department of Energy initiatives here and the EPA as it relates to unleashing the potential for energy savings in this area.

MR. BROOKMAN: Thank you. Rob.

MR. BOTELER: I was just going to make the comment one more time that we have a motor rule that's in process that will expand the scope of the product to cover pretty much everything that we're talking about with fans.

MR. BROOKMAN: Okay, yes, Mike.

MR. IVANOVICH: Mike Inanovich, AMCA. I didn't know exactly when to pop this slide up, but is it possible I can bring up this slide? Would you mind?

MR. JASINSKI: No.

MR. BROOKMAN: Why don't we do it after the break.

MR. IVANOVICH: Okay.

MR. BROOKMAN: You haven't loaded

the slide yet, have you? Have you loaded it? Okay, do it now. Pop it up. I thought you had to load it.

(Pause.)

MR. IVANOVICH: There it is. So this is a slide that we keep up to date. This is a timeline of efficiency metrics moving forward through codes and standards from 2012 to 2018, roughly. Right now, we're in that 2013 time frame where the 90.1 2013 version has already been approved. It's going to be published this year.

We've submitted in January 2013 a code change proposal to the -- which would be for the 2015 International Energy Conservation Code. We're preparing a continuous maintenance proposal for 189.1 which would be submitted in 2013 towards the 2014 publication of 189.1. We're working with IAPMO on their green supplement which will have a language in it that mirrors the 90.1 2013. It goes on and on.

We're going to be working on language changes for the 2016 International Green Construction Code. And then the cycle starts all over again with the 90.1 2016, 90.1, 2017, NIECC 2018, all of these things will be happening during the DOE rulemaking process. So we wanted to make DOE aware. And AMCA is a leader in the development of these change proposals. So I just wanted to make DOE aware of all of these things that are going on.

MR. BROOKMAN: Thank you. It's a useful slide.

MR. LLENZA: This is Charles Llenza. Thank you. This is the kind of information that could be of great use to us.

MR. BROOKMAN: Steve, final comment and then we're going to go to break.

MR. ROSENSTOCK: Steve Rosenstock. Yes, I just add on, typically in between since ASHRAE, I know, puts ones on continuous maintenance, typically, they publish a supplement in the midpoint between the three-year cycle that updates the addendum as well. So there's also the ASHRAE 2015 and a half midterm supplement that also again -- it's a supplement to the 2013 standard, but again for those states that are interested, they can always add that in there into their codes as well.

MR. BROOKMAN: Michael.

MR. IVANOVICH: So I get to make that slide more complex?

MR. ROSENSTOCK: Absolutely.

MR. BROOKMAN: Thank you. Let's take a break.

MR. JASINSKI: Doug, I have one more thing that's really important.

MR. BROOKMAN: Okay.

MR. JASINSKI: Just before we go, when considering the technology options in the efficiency levels, if there is an efficiency level -- am I not on? Hello? If there's an efficiency level that's only achievable using a proprietary technology, DOE will exclude that from its analysis. So if you're aware of proprietary technologies and efficiency levels that can only be achieved via that proprietary technology, that's something that DOE -- if you can make DOE aware of those proprietary technologies, we would be appreciative.

MR. BROOKMAN: According to the clock in this room, it's about eight minutes after 3. Let's try ten minutes. That means at 2:20, 3:20, we're going to resume. Go quickly. We still have a lot of ground to cover here. So we'll see you back here at 3:20.

(Whereupon, the above-entitled matter went off the record at 3:08 p.m. and resumed at 3:20 p.m.)

MR. BROOKMAN: Okay, we're now going to proceed with markups analysis and hear from Dave Winiarski.

MR. WINIARSKI: Hi, Dave Winiarski. I'm from Pacific Northwest National Laboratory and I've been asked to speak a little bit about two portions of DOE's preliminary analysis. These include the markups analysis which is used to help develop end user prices as well as DOE's energy use analysis.

I'll start with markups. So the purpose of DOE's markup analysis is to estimate actual final user prices based on the manufacturers' selling prices as developed in the engineering analysis for both equipment at the baseline efficiency levels established, as well as high efficiency equipment designs. It basically involves two steps. The first step is to identify the distribution channels for equipment as it moves from the manufacturer to the end user. And in that process, estimate the share of products of each channel that move or that pass through each separate channel.

And then the next step is really to estimate how within each channel the equipment is marked up as it passes from say the manufacturer to a distributor to some other entity and finally to an end user.

This next slide, I want to discuss some proposed distribution channels that DOE has in the framework analysis and these are really broken into maybe two major categories. The categorization is not shown here, but the first one is what I refer to is the original equipment manufacturer channel, channel A, where the manufacturer is building a fan and he's selling that fan to another manufacturer who is going to incorporate it in a final product. And that final product is what's actually sold.

When that second manufacturer, the OEM, sells the product, he commonly will run through his own product distribution chain until it gets to the end user. In this first OEM channel A, it's simplified. We just show it as OEM product distributor, but there may be actually some variations on that, depending on what types of products are being sold.

Within the next large category is what I call essentially the non-OEM distribution of products where you're essentially selling a fan that gets directly to an end user and is not incorporated in another product. So the different channels that we identified here, channel B which may be a very appropriate channel for many commercial fans sold into the building industry, the manufacturer would sell the fan to a distributor. The distributor would take possession of the fan physically. He would then sell that to a contractor. The contractor, like a mechanical contractor who would then install the fan in a building, potentially marking up the fan in that process, as well as selling his labor for installation.

The next, the third channel identified there, distributor channel C, the manufacturer does sell to a distributor, but the user, the end user actually purchases directly from a distributor. An example of that might be a case where you have industrial product where the industry may choose to purchase directly from the distributor and they're going to use their in-house labor to incorporate it in their particular product or particular industry.

Finally, we have direct-to-market end user channel D here where the manufacturer is essentially selling the fan directly to the end user. That could be done, for instance, in a case where you have a very large national account where the end user is the national account and they are purchasing the fans directly from the manufacturer. Or perhaps in a different scenario, the end user is contacting a manufacturer's rep directly. The manufacturer's rep then is helping out in terms of specifying the fans. But the physical fan actually is being sold directly from the manufacturer and there is no entity between the manufacturer and the end user that takes possession and resells the fan or marks the fan up.

Finally, we identified sort of what I would consider maybe a catch-all channel here which isn't accurately defined, but just channel E, other distribution paths for the products in this industry.

MR. BROOKMAN: So while this is fresh, let's just jump straight to it. Are these distribution channels, do they look right to you?

Dan?

MR. HARTLEIN: Yes, I'll take it. This is Dan Hartlein, Twin City Fan on behalf of AMCA. In general, we accept those distribution channels as representative. We also -- differently. Every manufacturer has a different approach to the market, so we would suggest that you get that from your manufacturing interviews.

MR. BROOKMAN: These are basic channels, but there are variants.

MR. HARTLEIN: All of the above exist.

MR. BROOKMAN: Yes, okay.

MR. HARTLEIN: All of the above exist.

MR. BROOKMAN: Other comments? Okay, thank you. Now let's move on.

MR. WINIARSKI: So within the distribution chain, there's going to be markups in the price of the product. The markups analysis helps to develop sort of the relationship between the manufacturer's selling price and the final end user's purchasing price. We actually do two types of markups traditionally in the equipment and appliance standards program. Those we refer to as baseline markups. Baseline markups reflect the relative overall incremental cost or a factor, an incremental cost factor to go from the selling price to the consumer price for products at the current baseline efficiency level.

And then incremental markups actually look at the ratio of the price or the price factor for going from an incremental price increase at the manufacturer, the manufacturer's selling price increase to a final incremental price increase to the end user. Those numbers are commonly thought of as different. They are different because we try to capture all of the expenses in that distribution chain. Some of those expenses will not scale with efficiency. For instance, salaries in the distribution chain may not necessarily scale with the cost of the product that's sold. Commonly, things like rental and occupancy don't necessarily scale, although that might not be the case if we're looking at larger fans. The total expenses for warehousing might increase.

MR. BROOKMAN: To the comment box. So we've already talked about 8-1. DOE requests information about the functioning of the manufacturer representatives and distributors for the different classes and different market segments that are covered in this rule. Specifically also, DOE requests information on the different OEM market segments that manufacturers will sell into and any information on the downstream distributor channels.

MR. BROOKMAN: Dan?

MR. HARTLEIN: I'll take that one.

MR. BROOKMAN: 8-2, right?

MR. HARTLEIN: 8-2, Dan Hartlein, Twin City Fan on behalf of AMCA. All markets have quite considerable OEM channels. I'm going to read you a quick list, just to kind of give you a representation. It's not meant to be exhaustive. We have manufacturers of heat recovery units, desiccant dehumidification and humidifiers, commercial HVAC manufacturers, car wash manufacturers, dust collector manufacturers, packaging systems, vacuum systems, food processors, dairy and cheese, restaurant hoods, fume extraction, odor control laboratories, petrochemical fire heaters, dryers for grain, peanuts and other food products, paint spray booths, oven manufacturers such as strip annealers, cure ovens for paint, baking ovens, et cetera, et cetera, et cetera. So it's quite an exhaustive part of what we do.

MR. BROOKMAN: And just to be clear because this is just so fundamental, you're making the fan and the fan housing for those?

MR. HARTLEIN: We are making the fan and often the fan housing, but again, there's many unhoused fans in some of those OEMs as well.

MR. BROOKMAN: Thank you. Go ahead, Michael.

MR. IVANOVICH: I think part of the point as well, a lot of those manufacturers are making their own fans.

MR. BROOKMAN: Yes.

MR. HARTLEIN: That's true, very good point.

MR. BROOKMAN: Good, good point. 8-3 has not yet been addressed.

MR. WINIARSKI: So DOE requests comments on the application and market segments identified by interested parties and information on the market segments including corresponding distributor channels and in particular, if it's useful to us, trade associations that might represent those distributors.

MR. HARTLEIN: I'll take that one again, Dan Hartlein, Twin City Fan, AMCA. Yes, AMCA obviously is one of those and we're proud to be part of that. I think we would like to, in the interest of time, suggest that we answer that in the written section.

MR. BROOKMAN: And help us with these -- 8-4 through 8-6, Dave.

MR. WINIARSKI: So in 8-4, DOE requests information on the proposed distribution channels and the share of total industry shipments that might be expected to go through each distribution channel.

MR. BROOKMAN: Sounds like maybe written comment on that?

MR. HARTLEIN: Yes, written comment and also maybe question the legality of the request. We're a little bit concerned that we're getting into things that we can't share, anti-trust issues here.

MR. LLENZA: The Department has -- Charles Llenza. The Department has a process where you can provide us information that may be confidential in nature from the industry's point of view. And we will use the information without disclosing it to the public.

MR. HARTLEIN: Okay.

MR. WINIARSKI: In 8-5, this is more of a catch-all, DOE seeks comment on other sources of relevant data that the industry or others feel is appropriate to characterize the markups for commercial industrial fans. In addition, 8-6, we'd like folks to analyze its proposal to use the incremental markup process for its life-cycle cost analysis efforts.

MR. BROOKMAN: Okay, more written comments there. Let's move on to energy use analysis.

MR. WINIARSKI: So as part of the analyses that feed into the DOE's life-cycle cost and payback analysis, DOE must analyze the energy use of the different classes of commercial industrial fans, as well as how that energy will change as we modify the efficiency descriptor that's being selected.

DOE's process here, we typically make estimates of the annual energy consumption for baseline as well as higher efficiency design. There's a lot of issues involved in trying to make those estimates, obviously. Some of these are that the end use load profiles are expected to be extremely variable across the different end uses and applications.

Another one is that not all fans will operate at their points of peak efficiency in practice. We've got some guidance here. We've heard earlier about trying to get products working in that -- where there's 15 percent around there, best efficiency point, but that may not be correct for all applications and it may not be correct for new versus maybe existing buildings, that type of issue. So whatever information that can be provided that's useful.

DOE's general approach in terms of estimating annual energy consumption is to develop some characterization of different operating points for a given class of fan in a given application; develop an estimate for the energy consumption for that fan at that point, actually the power consumption and multiply it by the number of hours that are at that point during the year, and then sum that all up. So it's a pretty standard process.

Go ahead.

MR. IVANOVICH: Is it possible to do plots on that? Graphs? Or is that just a single number response equation?

MR. WINIARSKI: Which?

MR. IVANOVICH: The AEC. Do you actually develop plot lines on that, graphs, charts?

MR. WINIARSKI: Well, for the annual energy consumption, we can. We can develop numbers for each efficiency level or some sort of plot that represents annual energy consumption levels.

MR. BROOKMAN: Gary. Prior to Gary, it was Michael. Now to Gary.

MR. FERNSTROM: Gary Fernstrom. Yesterday in the pumps meeting, we talked briefly about whether reactive power, the related distribution losses and costs should or should not be considered in the analysis. I'd like to recommend for fans and blowers, DOE similarly consider reactive power in whatever manner is decided for the pumps rulemaking.

MR. BROOKMAN: Steve.

MR. ROSENSTOCK: Steve Rosenstock. Yes, again, per yesterday, there is very little missing is any sort of energy consumption by the control system itself. It's not in this equation. That needs to be added under the extended appliance regime.

MR. WINIARSKI: If I can interrupt --

MR. ROSENSTOCK: Sure.

MR. WINIARSKI: Actually, the overall efficiency that's shown up there in the equation is actually the product of several different efficiencies including the efficiency of the fan itself, the transmission, the motor efficiency and any control system such as a VSD that might be on there.

MR. ROSENSTOCK: I see the control system efficiency, but again, is that the efficiency, but that efficiency -- again, I'm trying to -- the equation is the efficiency in terms of how that control systems affects the fan energy usage.

MR. BROOKMAN: We're diving rather deep late in the day.

MR. ROSENSTOCK: I'm sorry.

MR. BROOKMAN: I like this depth, but we're not going to go there now. Thank you.

Can you just consult with him and find out?

MR. ROSENSTOCK: Yes, and the other thing and getting back to the reactive power issue is I think that in terms of that again, I think there's -- if there's an issue where the systems, again, extended power, it would only be an issue is if the power factor of the systems is less than typically I'll say 85 percent and for the most part it's higher. If it's consistently less than 85 percent, then it's an issue. If it's typically higher, than it's not an issue. Thank you.

MR. FERNSTROM: So this is Gary. I disagree. I think it's an issue regardless of where you are in power factor because it does affect losses and cost.

MR. BROOKMAN: And now going to the comment box.

MR. WINIARSKI: There's a large number of comments that are in the energy use analysis. I'll go through relatively quickly here.

One of them, the first one here, we would like comment and input on recommendations for identifying high sales volume and large installed base market segments. We've got some of that already for specific industries that might have similar load profiles because developing load profiles may be difficult.

MR. BROOKMAN: So that's something I presume you don't have much comment on today.

MR. IVANOVICH: No, but we do have

a question.

MR. BROOKMAN: Yes.

MR. IVANOVICH: If you could clarify what they mean by load profiles because it might mean something different in the fan industry.

MR. BROOKMAN: Dave.

MR. WINIARSKI: When I think of a load profile, I think of how much. So it's really maybe two different things. You have sort of an operating load profile that you might have in a building, how often a fan is operated during the day. But you also include at what points of operation you might have, sort of pressure and volume for a given fan. So both of those impact the load profiles that we have to use in this type of analysis.

MR. BROOKMAN: Okay.

MR. WINIARSKI: And getting to that point, we welcome any recommendations on sources of data or analysis methods that would help generate those different end user load profiles for the different market segments.

DOE requests, 9-3, DOE requests input on ways to characterize fan sizing and selection practices. We've actually heard a fair amount of that earlier today. But anything that could be put in writing would be useful. And in general, because we're looking at range of sizes, we may be needing to develop sort of normalized load profiles and how those get normalized to a given fan size.

Finally, we recognize that there are a large number, probably of uses, for which data for developing load profiles may be difficult and we certainly welcome any information on what might be appropriate generic-looking load profiles for given industrial applications, for instance.

MR. BROOKMAN: Dan, do you have something on this right now?

MR. HARTLEIN: Dan Hartlein, AMCA. I am sitting here with quite a bit of bewilderment to be honest. We have no idea how to do that. So just to be clear. So we would like to know how to do that as well. I don't think we're a source of ideas or data there.

MR. BROOKMAN: We appreciate you saying that because it points to a gap potentially, so that's good.

MR. HARTLEIN: We have no idea how to do that.

MR. BROOKMAN: Okay, excellent. We're moving on.

MR. WINIARSKI: So one of the issues that's very important, I guess, in this rule-making, is looking at the current penetration level of variable frequency drives in the different installed base of products. That's going to become important regardless of what metric DOE decides to go down with in terms of establishing standards.

DOE requests comment and recommendation on the range and number of rotation speeds over which any analysis should be carried out.

DOE requests information on current industry practices and for the selection of typical or representative operating points in the field. We've heard a little bit about that with regard to the range around the best efficiency point, but there may be other options that DOE needs to consider. And as part of that how far in our analysis should we be looking at around -- should we be extending to a range of operating points around that peak efficiency realm for the different applications.

Going back to the equation that was shown earlier, we talked about the values for motor transmission and motor control or VFD efficiencies. We certainly would like any comments that could point to what might be good mean values or representative values, for instance, for different transmission efficiencies that could be used in the energy analysis.

MR. BROOKMAN: No response at this time.

MR. WINIARSKI: And I think we move on.

MR. BROOKMAN: Okay.

MS. IYAMA: Okay, so next, we'll talk about the life-cycle cost and payback period analysis. And I'll try to move quickly on the next sections.

So the purpose of the life-cycle cost and payback period analysis is to determine the life-cycle cost and payback period for the users of commercial industrial fans. And the life-cycle cost is actually composed of two components, the total installed price and the lifetime operating costs discounted to a particular base year. The economic evaluation is done from the consumer's perspective and results are expressed in terms of LCC difference. That's the difference between a baseline LCC and the LCC at a particular standards case.

And we're also looking at payback period which is total installed cost divided by the change in the first year of operating costs.

The approach for the LCC will be: developing a fan selection model to reflect product choices by customers. We'll develop a baseline market efficiency distribution to reflect the fact that some users are currently already buying more efficient fans, even in the absence of a standard. We'll be developing efficiency distribution in the standards case to reflect the expected efficiency distribution for the compliance year, the year where the standard will come into force.

We'll be looking at annual energy consumption, not just for one year, but over the fan's lifetime and we'll be modeling uncertainty and variability of the inputs using a Monte Carlo simulation approach which characterizes the inputs in terms of probability distributions. And again, we'll be looking at payback period.

Next, the few slides that I have go through the inputs to the LCC that haven't been discussed already in the engineering, markups, and energy use analysis. So part of the total installed cost, in addition to the fan product price which is derived from the outputs of the engineering and the markups, we'll be looking at installation costs. For the calculation of the operating costs, we'll be looking at energy prices. For price trends, for energy price trends, we'll be looking at the EIA's annual energy outlook. For the operating costs, we'll be also looking at maintenance and repair costs and not only costs, but also any impacts on the efficiency of the product for the fan along its lifetime.

Another important input to the LCC is, of course, the equipment lifetime and in the framework we provide some preliminary information that we've collected. Fan lifetime between 10 and 25 years with an average estimate of 15 years.

Discount rates will be applied to convert the values of money into present value and again, we'll be looking at efficiency distributions to characterize the current efficiency range of products in the base case and in the standards case.

And if no market efficiency data is available, DOE may look at available models in catalog data.

We've reached the comment boxes. DOE welcomes comment on the factors that impact the installation costs for fans and on whether installation cost increases with higher-efficiency equipment.

DOE welcomes input on the proposed methodology for estimating current and future electricity prices.

DOE invites comment on how repair costs may change for more efficient fans. DOE also invites comment on repair practices and how usage patterns may impact equipment repair and maintenance.

DOE welcomes information that will assist in determining an appropriate distribution of fan lifetimes for the equipment classes covered in this rule-making.

DOE welcomes input on the proposed approaches for estimating discount rates for fan users.

And DOE requests data on the efficiency distributions and welcomes comments on the likelihood and degree of improvement in efficiency of commercial industrial fans in the next five to ten years as a result of market forces or industry trends.

MR. BROOKMAN: Let's start with 10-1. What do you anticipate will happen, what will happen with the installation costs on fans? Will, for example, there be installation cost increases with higher efficiency equipment?

Yes, Mark?

MR. BUBLITZ: Mark Bublitz, New York Blower Company representing AMCA.

If the end user gets a more efficient product that would usually result in a larger fan running at slower speed. So you would consume more space. It would be heavier if it was up off the ground.

MR. BROOKMAN: I see. It's not the fan itself.

MR. BUBLITZ: If you could make a fan a couple points more efficient, aside from the expense that went into product development.

MR. BROOKMAN: Okay, the installation costs, okay, got you. We got it. Other comments on this one? I'm about to move on to electricity prices.

Steve, you always comment on electricity prices, understandably.

MR. ROSENSTOCK: No comment at this point.

(Laughter.)

MR. BROOKMAN: For the record, the facilitator is picking himself up off the floor.

(Laughter.)

MR. ROSENSTOCK: This is Steve. I hope the facilitator didn't hurt himself.

(Laughter.)

MR. BROOKMAN: Okay. Please, Michael.

MR. IVANOVICH: Regarding the model itself, again, AMCA really wants to emphasize the importance of product selection, sizing. Would the model be sophisticated enough to respond to the fact that a higher efficiency could increase costs and lead to a smaller size selection which would increase energy consumption?

MS. IYAMA: We'll try to take that suggestion into account.

MR. IVANOVICH: Thank you.

MR. BROOKMAN: Okay, now I'm looking at 10-3. How repair costs may change for more efficient fans and also the issue of repair and maintenance for more efficient fans. Can you forecast how that might go? Mark?

MR. BUBLITZ: Mark Bublitz, New York Blower Company on behalf of AMCA. We don't anticipate the repair costs would be impacted.

MR. BROOKMAN: And maintenance?

MR. BUBLITZ: No.

MR. BROOKMAN: No? Okay. 10-4, appropriate distribution of fan lifetimes for the equipment classes covered in the rule-making. Do you have -- nothing on that at this time.

Discount rates for fan users. Do you anticipate that would be changing? Yes, okay.

MR. BUBLITZ: That's an economic analysis. I don't think a fan user would exist in that world.

(Laughter.)

The question is one company has a different discount rate than another. I think that's kind of a financial marketing analysis and it would just be a function of the market, financial market.

MR. BROOKMAN: I'm going to 10-6 just to be complete here. On the likelihood and degree of improvement, in efficiency of commercial and industrial fans in the next five to ten years as a result of market forces or industry trends.

Yes, Michael.

MR. IVANOVICH: Yes, as I showed on that slide earlier, the trendline is that fan efficiency requirements in minimum codes and standards for energy efficiency and green construction are certainly evolving quickly during this time period. And this is a catalyzing effort to engage the market and a lot of marketing communications about fan efficiency and the importance of it. So I really think that the efforts that AMCA and the industry are pursuing right now on codes and standards is going to affect this trendline very much.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock. Yes, to follow on that as well, I have noticed that in certain jurisdictions that minimum codes are being replaced by green building codes. For example, in D.C., if you're over 50,000 square feet, you have meet LEED, you have to be certified LEED to get a certificate of occupancy. And LEED requires higher energy efficiency significantly above ASHRAE 90.1 and does give credit for other high efficiency technologies. So that is also -- and there are other areas of the country where we're noticing that trend as well, so that's also going to have a push on all technologies.

MR. BROOKMAN: Thank you.

MR. HARTLEIN: Just a side comment, Dan Hartlein, Twin City Fan and AMCA, as well. The FEG program does address the need to select a fan closer to peak efficiency. So that in itself as it's adopted should drive solution or a major solution to what is the biggest problem we have in energy consumption in this industry.

MR. BROOKMAN: Tim? Pardon me, Michael.

MR. IVANOVICH: Mike Ivanovich. One of the indicators now is that AMCA started its certification program for fan efficiency grades around 2010. The uptake on that was kind of slow primarily because the original requirement in codes and standards involving fan efficiency grades, but now that those are on the horizon, the rate at which that's been increasing has been significant. There are now, I believe, 35 manufacturers that have fan efficiency grades certified by AMCA and over 264 fan models, certified fans.

MR. BROOKMAN: So there are some significant trends in the market and industry. Okay, good.

So in addition to amplifying those in your written comments, and you've already started that with all -- okay. We're moving on.

MS. IYAMA: Thank you. So next I'll talk about the shipments analysis which is an input to the national impact analysis.

The purpose of the shipments analysis is to project future shipments by equipment class over a period of 30 years beginning at the expected compliance year of the standard. DOE may characterize the projected production of fans using economic indicators such as private fixed investment data for equipment incorporating fans. And DOE may use different shipment projections in the standards case as compared to the base case. And that would be to reflect the impact of increased equipment costs and reduced operating costs on shipments.

And the comment box on the shipments analysis. DOE welcomes comment on the shipments projection methodology. DOE invites comments regarding the selection of appropriate economic drivers and sources of data for historical shipments and shipments breakdowns by equipment class.

DOE requests historical shipments data for each of the considered equipment classes.

And DOE welcomes comment on how an energy conservation standard for fans might impact shipments of the equipment covered in this rule-making.

MR. BROOKMAN: Michael?

MR. IVANOVICH: Yes, basically we'd just like to refer DOE for our answers for 5-1 and 5-2.

MR. BROOKMAN: Okay. And national impact analysis.

MS. IYAMA: The purpose of the national impact analysis is to determine the national energy savings and the national consumer economic impacts under different standard levels. And in order to do so we'll be developing annual values of, annual time series of values over 30 years of shipments starting at the compliance year and we'll do this for the national energy savings and the national consumer economic impacts.

We'll be using the shipments model to estimate the stock of affected products by the standard each year. We'll be using the LCC outputs to develop total installed cost and energy use data each year. And we'll be aggregating costs and energy use over that 30-year shipments and 30-year analysis period.

For the calculation of the national energy savings, we'll be looking at, each year, the difference in energy use between the base case and the standards case. And we'll be taking the cumulative savings over the period. That provides the national energy savings expressed in primary and full fuel cycle savings.

For the NPV, we'll be calculating

the difference, each year, in operating costs and the difference, each year, in total installed costs between a base case situation and a standards case situation. We'll convert that into present value using discount rates over 30 years and take the difference to get to the national consumer NPV, net present value.

And there's no comment boxes for this section. So let's continue with the preliminary manufacturer impact analysis.

MR. JASINSKI: Thanks, Sam Jasinski from Navigant Consulting again. As I mentioned earlier, DOE also conducts a manufacturer impact analysis. The activities for the manufacturer impact analysis are greatly expanded in the NOPR phase, but DOE does take advantage of the preliminary analysis by conducting a preliminary manufacturer impact analysis. The primary purpose of this analysis is to assess the potential impacts of energy conservation standards on the manufacturers of fans.

The method that DOE uses is to conduct interviews with manufacturers. During these interviews, for the preliminary manufacturer impact analysis a lot of the discussion is focused on the engineering side of things, but it is also used to identify major issues and the potential outcomes. At the end, DOE will collate the interview responses and prepare a summary of these major issues and outcomes and start to conduct a strawman industry cash-flow analysis based somewhat on interview responses, but also on publicly available financial information, primarily from SEC 10Ks and things of that nature.

Some of the major goals of the preliminary manufacturer impact analysis are identify manufacturer subgroups. These are any subgroups that might be disproportionately affected by the efficiency standards and one default subgroup that is always -- the DOE is always concerned with is identifying small businesses and conducting a Regulatory Flexibility Act analysis to determine the impacts of the standards on the small manufacturers.

Secondly, the cumulative regulatory burden which we touched on earlier also about identifying and considering the impact of multiple product specific regulations on the manufacturers, whether they be part of the DOE Defined Standard Program or outside regulations as well.

So at this time DOE requests comments on identifying subgroups for fan equipment manufacturers that we should consider in the analysis.

MR. BROOKMAN: Yes, Aniruddh.

MR. ROY: My name is Aniruddh Roy, AHRI. I just have a few comments on the cumulative regulatory burden just as examples. For example, let's say there's a furnace manufacturer that manufactures its own fan.

The fan is installed and obviously the furnace which is a regulated product as well as maybe other unregulated products, that manufacturer would be subject to rule-makings that include the FER metric which is coming up on residential furnaces, the existing AFUE and the standby and off-mode requirements that will be in place shortly, as well as potential regulation on the fan from this rule-making.

Another example is package systems where you have the 63-ton units that are above that limit. They're unregulated. And so they would need to meet the fan efficiency requirements per this rule-making, but would be subject to the DOE energy conservation standards below 63 tons. Although the product itself, the package system itself is essentially the same, it's just a higher tonnage.

Another example is residential A/Cs and commercial package A/Cs. Again, the principle, the design and spirit might be the same, but you have to meet the SR and the EER requirements on the energy conservation standards depending on the product size. And then on top of that, if this fan which is used in this package product goes into another unregulated product, then you have to be subject to another fan efficiency requirement per this rule-making. So we would encourage DOE to keep that in consideration.

Coming back to our opening remarks on the ASHRAE 90.1 standard and keep this in mind during this aspect of the rule-making.

MR. BROOKMAN: Okay, thank you. Yes, Michael.

MR. IVANOVICH: This kind of combines 14-1 and -2. And then Dan may want to weigh in after me.

But basically, we'd just like to emphasize again that 87 percent of AMCA members are small businesses or 80 percent. And in our perspective, we're going to be going underneath the regulatory change already with codes and standards, as I showed on that timeline. That not only represents changes, potential changes in tooling and things of that nature, but also the investments that they're having to make in sizing, selection, software changes, literature changes that are printed in electronic catalogs, websites, training their reps, training their customers, we're undergoing a sea change in the fan efficiency industry right now. That is going to be cumulative over time and potential changes that DOE would implement on that could be especially burdensome in that regard.

So to invest all of these things over that long of a timeline and then have to reinvest again could be considerable.

MR. BROOKMAN: Okay, thank you. Dan.

MR. HARTLEIN: Dan Hartlein, Twin City Fan and AMCA. Just a small comment, back to reiterate the small business participation in our industry, you mentioned SEC 10K filings. I'm not sure there are any. I'm trying to think of a publicly-held company that's in our space and I'm not coming up with a single one. So I don't think you'll find that data. So you're going to have to get that in the manufacturers' interviews.

MR. BROOKMAN: Okay, thank you. Helpful. I'm scanning through 14-1, 14-2, and 14-A and I think we've kind of addressed all of them, but I'll give you another chance to look and make sure we have. Any question or comment?

Your name, please?

MR. LAU: This is Chris Lau from Navigant. This question is directed to AMCA. Several times now you've referred to your membership as 80 percent small businesses. And sometimes you referred to them, you've been citing revenue numbers. The definition we'll be using in our analysis is based off the SBA definition of small business and so it's got an employee threshold. I think your members fall under that. I just wanted to confirm though. Thank you.

MR. BROOKMAN: Okay, thank you.

MR. JASINSKI: I'll hand it back to Sanaee. Thank you.

MR. BROOKMAN: So these are the beginning of NOPR analyses and these are downstream a fair bit. So we're going to go through these rather rapidly.

MS. IYAMA: So the NOPR starts with a revision of the preliminary analysis chapters that we've discussed and then there are the new chapters, downstream analysis, starting with the customer subgroup analysis.

The customer subgroup is basically an LCC, but targeted towards a specific subset of user population which could be disproportionately impacted by standard. And so the method used is to expand the LCC analysis to examine the impacts for that specific subgroup. And in order to do this, we use inputs specific to each of the considered consumer subgroups in the LCC.

Comment box, DOE welcomes comment on what, if any --

MR. BROOKMAN: You can skip the comments.

MR. STEVENS: Well, I'm sorry, we talked about cross flow fans and air curtains earlier today and they are a particular consumer group that can be adversely affected.

MR. BROOKMAN: Thank you. Thanks for getting that in there. Okay. Other comments? I don't want to foreclose anything.

MS. IYAMA: Next we'll talk about the utility impact analysis. The purpose is to assess the overall impacts on domestic energy suppliers that would result from the imposition of standards.

The typical method that DOE uses is to use NEMS-BT, a modified version of the NEMS model which is the model used to develop the Annual Energy Outlook projections that you see in DOE/EIA reports.

Outputs are expressed in terms of electricity sales, price, and avoided capacity resulting from potential standards.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. In terms of this, especially in terms of -- it says avoided capacity and that's really the peak power usage of the equipment and also yesterday with the pumps, not necessarily annual energy consumption. The peak demand is really the driver for new capacity typically.

And the issue here is again not to -- is under the extended regime, we're talking about variable speed drives and all the other controls is they're variable and in terms of the application, in terms of -- they'll save energy, but under peak load condition they don't save energy. In fact, depending on the energy usage of that control or the drive at a peak loading condition it can actually equal or actually slightly increase peak demand by the fan system, I'll say for lack of better words. I just don't want to just isolate things.

So I hope the analysis can take that into account because you're talking about equipment with variable savings and variable impacts on the actual usage of the system, the actual impact on any sort of avoided capacity will be highly variable. Thank you.

MR. BROOKMAN: Thank you. No additional comments.

MS. IYAMA: Next I'll go over the employment impact analysis. So in the MIA we discussed direct employment impacts and in this section the purpose is to assess the indirect employment impacts which could result from shifting consumer expenditures. In order to evaluate those impacts, DOE intends to use the ImSET model.

MR. BROOKMAN: Comments on employment impact analysis? Okay.

MS. IYAMA: Next, emissions analysis. The purpose is to estimate environmental impacts from potential energy conservation standards for fans including changes in Full Fuel Cycle emissions. So basically here, we'll take the outputs of the national energy savings and convert those into emissions savings.

DOE is also going to monetize those emissions savings using social cost of carbon values developed outside of DOE which are represented here and DOE will also estimate the potential monetary benefits of reduced NOx emissions.

MR. LLENZA: Just a comment from Charles Llenza, Department of Energy here. Those numbers usually come from the group of government entities that regulate emissions, EPA is one of them. And it's a number that we're handed to for our analysis.

MR. BROOKMAN: Steve Rosenstock.

MR. ROSENSTOCK: Steve Rosenstock, EEI. Sorry, for those of you who were in the room yesterday, I'm going to repeat myself.

Since we're talking about over the next seven years, many of the emissions shown here will have caps and for many of these emissions, emissions have been going on significantly over the last 10, 20, or 30 years from the electric power sector.

And right now, there's regional caps on certain emissions, especially CO2 and I hope that DOE does take and I'll write this in the comments, but you know, I hope that wherever there's a cap or future cap that DOE takes it into their -- accounts for it in their analysis like they've done correctly with SO2 and nitrogen oxides. Thank you.

MR. BROOKMAN: Okay, thank you. Additional -- yes.

MR. IVANOVICH: Just one quick comment. I know that EPA has just published new rules, rule-makings on emissions for commercial and industrial boilers and power plants. What is the time frame for their emissions reductions associated with that that might factor into the 30-year DOE analysis?

MR. ROSENSTOCK: Steve Rosenstock, EEI. For the commercial/industrial boilers, the large ones, there's two types, major source and area source, I believe that both of those regulations, I believe that for those final rules they go in effect within two years, so I would say -- I'll say 2015 at the latest. And for the largest ones, it might be even sooner. I think it's -- I would say within two years, effective date.

MR. IVANOVICH: I think that's pretty significant. Thank you.

MR. BROOKMAN: Other comments on emissions analysis? Okay.

MS. IYAMA: So the last section of the NOPR is the regulatory impact analysis. In this section DOE will explore the potential for non-regulatory alternatives to new efficiency standards. And this assessment will be based on actual impacts of any such initiatives to date and also will consider information presented regarding the impacts that any existing initiative might have in the future.

And with this --

MR. BROOKMAN: Comments on the regulatory impact analysis?

So as we had promised this morning now is another opportunity for anybody who wishes to make final remarks, raise additional issues that were not covered sufficiently during the day today for anybody that wishes to.

Michael?

MR. IVANOVICH: On behalf of AMCA International and its members, I would just like to say thank you very much Department of Energy for this opportunity to share our analysis and framework document and to make our first experience working with DOE in this collaborative fashion, what we perceive to be very, very positive. So thank you very much.

MR. BROOKMAN: Thank you. Other

comments here as we move towards closure?

One housekeeping item.

MR. LLENZA: There's two.

MR. BROOKMAN: Do you want to do this?

MR. LLENZA: I'll do this.

MR. BROOKMAN: And from my perspective, I'll turn it back to Charles Llenza. Thanks to all of you. This was a very, very effective meeting today. We covered a lot of ground and very effective input by all of you. So many thanks and safe travels.

MR. LLENZA: Okay, I have a little housekeeping item on the questions that we had submitted. I just wanted to make a general comment. I think we have to apologize. We didn't do such a great job of matching up the questions from the framework to the actual presentation. So as baseline, let's use the questions in the framework document because that's what we published. That's online.

Those are the correct questions.

We're going to update the presentation with the correct questions just to keep our paperwork in order and for future people that might refer to the presentation. They all match up.

So let's use the framework, it's page 66 through 71 of the framework, I'm sorry, 72 of the framework document. Those are the correct questions to use and when you see a C on the number of the question, that just means that's a subset of that question, so you could just refer to that subset C dash a number dash a number subset A, B, C or D, whatever it is. Usually, we give it a number. If we have a subset, we add another -- we add the alphabet number to the side just to identify the question.

Again, how to submit comments here. Please make sure you have the docket number or the RIN number on the submittal and you can see from the slide where to submit and how to submit. The comment period ends May 2, 2013.

On the ASRAC meeting this next week, there was a little bit of confusion about a webinar, not a webinar. I have from my boss, it's being set up. We have your business cards. I've given the staff your business cards, emails, and we should send out an email invite to all parties that attended today's meeting and yesterday's pumps framework meeting as to if they wanted to attend via webinar the ASRAC meeting. You're also welcome to attend in person.

Sure, go ahead.

PARTICIPANT: Is attendance on the webinar limited?

MR. LLENZA: As far as I know there is no limit.

PARTICIPANT: So we can pass the information along to other people?

MR. LLENZA: Oh, yes. More than welcome to -- part of our reason of providing webinars is not everybody can travel, but the other thing is we do have limitations if everybody showed up in some of these rooms. So hopefully that won't be the case on the actual webinar website. But we've never hit a ceiling. Let's put it that way.

And then my closing remark is thank you for attending and bearing with this process. I know it's tedious because I'm tired and I'm sure that many here are tired. But we are looking forward to working with everybody that's attended today, people at the webinar and other parties that couldn't attend, to have a good rule-making in terms of fans and blowers here at the Department of Energy. Thanks again for attending. That's it.

(Whereupon, at 4:13 p.m., the public meeting was concluded.)

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C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Energy Conservation Standards for Commercial/Industrial Fans & Blowers

Before: US DOE

Date: 02-21-13

Place: Washington, DC

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

Neal R Gross

Court Reporter