Electricity Advisory Committee Meeting

8:33 a.m. through 2:49 p.m.

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National Rural Electric Cooperative
Conference Center
4301 Wilson Boulevard
Arlington, VA 22203

ELECTRICITY ADVISORY MEMBERS PRESENT:

Richard Cowart, Chair
Regulatory Assistance Project

The Honorable Lauren Azar, Vice Chair
Wisconsin Public Utilities Commission

Guido Bartels, IBM

Rick Bowen, Alcoa

Frederick Butler
Salmon Ventures Ltd. And
New Jersey Board of Public Utilities (Ret.)

Ralph Cavanagh
Natural Resources Defense Council

Lisa Crutchfield
National Grid USA

The Honorable Robert Curry
New York State Public Service Commission

José Delgado
American Transmission Company (Ret.)

Roger Duncan
Austin Energy (Ret.)

Robert Gramlich
American Wind Energy Association

Michael Heyeck
American Electric Power

Joseph Kelliher
NextEra Energy, Inc.

Edward Krapels

Anbaric Holdings

Barry Lawson
National Rural Electric Cooperative Association

Ralph Masiello
KEMA

ELECTRICITY ADVISORY MEMBERS PRESENT:

David Nevius
North American Electric Reliability Corporation

Irwin Popowsky
Pennsylvania Consumer Advocate

Wanda Reder
S&C Electric Company

Brad Roberts
Electricity Storage Association

The Honorable Tom Sloan
Kansas House of Representatives

The Honorable Barry Smitherman
Public Utility Commission of Texas

Richard Vague
Energy Plus Holdings, LLC

Peggy Welsh
Energetics, Incorporated

Gordon van Welie
Independent System Operator of New England

Mike Weedall
Bonneville Energy Administration

Brian Wynne

Electric Drive Transportation Association

PUBLIC PRESENT:

Joe Watson
Director, Exelon Corporation

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P R O C E E D I N G S

MS. HOFFMAN: We're going to go ahead and get started this morning; but before we get started and I turn the mike over to Rich and Cathy, what I'd like to do is just have everybody go around the room and introduce themselves just briefly so we can get to know each other better, and Cathy can get to know who all's here. Thank you.

I guess I'll start. I'm Pat Hoffman. I'm the Assistant Secretary for the Office of Electricity Delivery and Energy Reliability at the Department of Energy.

And I thank you for joining the EAC Committee.

MR. SMITHERMAN: Good morning. I'm Barry Smitherman. I'm the Chairman of the Public Utility Commission of Texas. Thanks for having me.

MS. HOFFMAN: Are you new?

MR. SMITHERMAN: No.

MS. HOFFMAN: If you wouldn't mind, just say whether this is your first meeting as an EAC member or whether you're a returning member that would be helpful to me, too. Thank you.

MR. SMITHERMAN: I'm a returnee.

MR. VAN WELIE: Good morning, my name's Gordon van Welie. I'm with ISO of New England, and this is my first EAC meeting.

MR. CURRY: Also my first EAC meeting. I'm Bob Curry from the New York State Public Service Commission.

MR. DELGADO: I am José Delgado, recently retired President CEO of the American Transmission Company, and I am a returnee.

MR. GRAMLICH: Good morning, Rob Gramlich, Senior Vice-President for Public Policy at the American Wind Energy Association, and Transmission Wonk, former FERC staff and returning member.

MR. KELLIHER: I'm Joe Kelliher, Executive Vice-President of NextEra Energy, and

this is my rookie meeting of this or any other advisory committee. So I'm curious what it'll be like -- and a recovering regulator.

MR. LAWSON: Good morning. I'm Barry Lawson. I'm the Manager of Power Delivery with the National Rural Electric Cooperative Association, which is -- this is our building, and we're -- we're happy to be hosting the meeting.

And I'm a returnee, and there are no special favors given to me for the EAC for having the meeting here today. So we're just happy to be able to host.

MR. NEVIUS: Dave Nevius, Senior Vice-President of North American Electric Reliability Corporation. I'm a returning member.

MR. ROBERTS: Brad Roberts. I am here in my capacity representing Electricity Storage Association; and I'm a returning member.

MR. WYNNE: Good MORNING. I'M Brian Wynne. I'm President of the Electric Drive

Transportation Association -- also a rookie.

MR. WEEDALL: Mike Weedall, Bonneville Power Administration -- first meeting.

MR. VAGUE: Richard Vague, Energy Plus -- first meeting.

MS. REDER: Wanda Reder, Vice-President at S and C Electric Company and immediate past president of the IEEE Power and Energy Society -- first meeting for me.

MR. SLOAN: Tom Sloan. I'm a State Representative from Kansas, representing every state legislator in the country, and I'm a returnee.

MR. POPOWSKY: Hi, I'm Sonny Popowsky. I'm the Consumer Advocate of Pennsylvania. This is my first meeting.

I think it may be the first meeting for a State Consumer Advocate as a member of this council. Thank you.

MR. MASIELLO: Ralph Masiello, KEMA. I'm a returnee.

MR. KRAPELS: Ed Krapels, Anbaric. I'm a rookie. My company incubates transmission projects and micro grids.

MR. HEYECK: Mike Heyeck, a Senior Vice-President Transmission and American Electric Power. I'm a transmission junkie. I'll also be President of the U.S. National Committee of CIGRE, and I am an elected official in Ohio.

MR. DUNCAN: I'm Roger Duncan. I recently retired as General Manager of Austin Energy Municipal Utility in Austin, Texas, representing municipal utilities. This is my first meeting.

MR. CAVANAGH: Ralph Cavanagh, Natural Resources Defense Council, returning member.

MR. BOWEN: Rick Bowen. I'm the President of Energy for Alcoa. I'm a rookie as well.

MS. CRUTCHFIELD: Lisa Crutchfield, Executive Vice-President at National Grid, a former Pennsylvania Public Utilities commission

Commissioner; and it's my first meeting.

MR. BUTLER: Fred Butler, former Commissioner New Jersey Board of Public Utilities and immediate past president of NARUC. I'm now a consultant to and work in the energy and water utilities field. It's my first meeting.

MS. AZAR: Good morning. Lauren Azar. I'm a Commissioner of Wisconsin and the President of the Inter - Eastern Interconnection States Planning Council, also referred to as ice pick. This is my first meeting.

MR. MEYER: I'm David Meyer. I'm in the Electricity Office of DOE -- the same office that Pat is in -- and I'm the principle DOE liaison to the Committee.

MR. COWART: And we appreciate it.

I'm Richard Cowart with the Regulatory Assistance Project, formerly Chair of the Vermont Public Service Board and I like that phrase recovering regulator. At RAP we never recover; we just try to assist.

And I want to thank you all for your service. It's an honor to be here. It's my first meeting, and I look forward to learning from you and working with you all.

MR. ZOI: And I'm Cathy Zoi, Acting Under Secretary of Energy as well as Assistant Secretary of Energy for Energy Efficiency Renewables. Two jobs are better than one. And I'm delighted to be here.

MR. COWART: I'm reminded to remind you-all that these meetings are as -- as I think is pretty obvious -- public -- open to the public and are being transcribed.

So, when you speak, please turn on your mike, speak clearly so that the transcribers can understand what you said.

And I think as we get into discussion one thing I'll ask people to do is to use the tent-card system when you want to be called on. Stick your tent card on end and then I'll know that you want to be in the cue. Thank you.

MS. ZOI: So, I think -- I would just love to kick this off and with two sort of objectives. The first is a big one, which is to say thank you. You-all are taking your precious time to contribute to the public policy conversation; and we greatly, greatly appreciate it. I mean, this is a very, very impressive group of people that are -- that all of you who are willing to take the time and advise us. And the combination of the -- of the veterans and the rookies is -- is exciting, I think. We are really, really thrilled that you are here.

We're also thrilled to have our members of the public and -- of the interest community here witnessing what's going on. The Administration is completely committed to transparency and our public conversations; and so, this is, again, exciting that we've got folks here watching.

I guess the second thing is I would say I'm excited about the fact that we've got lots of

work to do. Everybody sort of knows that we've got three intersecting challenges that are huge and looming large in this country.

We've got national security issues intersecting with environmental challenges, intersecting with an economy that needs to get out of malaise. Those intersecting challenges are linked by energy kind of being at the center. And within that, of course, electricity is central.

So, and the spirit of the problem creates the opportunity. I genuinely believe - Secretary Chu genuinely believes, the President and the Vice-President genuinely believe that it's the clean energy transformation that's going to be the engine that can address all of those things concurrently.

And what you will notice is with the $90 billion invested through the Recovery Act we've made a down payment on that transformation. The transformation will take decades, but we're off

to a good start. And, you know, under Pat's wonderful leadership we've got a couple billion dollars injected into hastening that transformation to a modernized grid.

We were talking about that at the beginning with some of the folks who are here. We got all the money obligated, and now we are pivoting to making sure that the projects are implemented well, which I have no doubt they will be; but then pulling out the lessons from those projects that are happening across the country and being able to translate them to our colleagues so that the evidence -- the experiences of those sort of cutting edge first smart grid projects, whether it's a metering orientation, or a distribution orientation, or whether it's a new transmission line, all of those lessons are being translated to others in the other areas where we're working, whether it's energy efficiency and renewable energy and with my other hat on, we've got - literally, ERE has

7,000 projects underway at the local level that are demonstrating that clean energy is creating jobs. It is creating wealth that the technologies are ready for primetime.

So the questions and the challenge we all have is translating that significant experience into a clean energy transformation that creates wealth, improves national security, and improves environmental outcomes.

So, we've got the Recovery Act. That's our evidence. For the next 12 to 24 months we want to build on that foundation in grid, in transmission, in efficiency, in renewable energy, in sequestration, in the nuclear space and figure out how to take that -- and that next chapter can be hastening the transformation.

And we'll need your help and advice on all of that, and that's why I'm so delighted that you've come together.

What am I most hopeful that you'll be able to help us with? Well, you probably know

this, but the Department of Energy is the largest R and D body in the world. We would like your advice on how to prioritize that research and development investment in the areas in the electricity sector.

One of the things that we've taken on is trying to invest in the things that really matter and where the federal government is uniquely positioned to invest where it's complimentary to what the private sector is doing.

We hope that we're getting it pretty right, but we may not be; and we want your advice on how to get it right.

Once -- the second area is -- and Richard and I have talked about this -- once we've made and R and D investment, how do we make sure that the fruits of that effort are then translated into the marketplace? What are the things that we need to do to ensure that if we've got an innovation that's happened out of one of our national labs or through some university-

sponsored research, or we funded through an entrepreneur through ARPA-E that the electricity industry players have access to that innovation, know about that innovation, have the support to get that innovation out into the field through demonstrations.

And then, of course, it's RD and D -- how do we then do massive deployments? And that's kind of where the policy conversation starts to take place. How do we take the good evidence from a really interesting Smart Grid success story and make sure that the policy settings are there to encourage that to happen across the country?

And, again, that's partially the hardware and the data, and it's partially the conversations that you-all have with your colleagues, that you-all have with your elected officials, that you-all have with consumers in your areas wherever you've come from. So, moving R and D innovations into the marketplace through

demos and then deployment and sensible policy forms whether they're at a state or national level.

One of the things that I'm really excited about that Richard, and Pat, and I have talked about with Secretary Chu is that perhaps starting now the work products from this Advisory Committee can be in rapid short bursts as opposed to long-term investments.

We have an appetite in this Administration to keep the progress going. As I say, the Recovery Act was an unprecedented investment in clean energy. We would love to get your wisdom and your advice on some of the things that you're going to be discussing later today. Do it quickly and in a form that is going to be useful to help us over the next 12 to 24 months. So, we really mean it. If you can get some briefs together, we don't need -- we don't necessarily need you to invest in hundred, 200, 300-page reports unless it's warranted. Feel

free to provide us briefs that say, look, our collective experience in this sector is 400 years or something like that. I mean, I'm just guessing.

I'm – you guys should do that over lunchtime -- figure out what your collective decades long or centuries long experience is in this crowd. If you guys can come up with a set of recommendations that's sensible -- if this group can reach a consensus on a set of good recommendations on how to best integrate lots of renewable into the grid, how do we actually inform all the utility commissions that are a little bit nervous about efficiency investments to be comfortable with efficiency investments -- how to make sure that consumer advocates understand the benefits of Smart Grid.

If you can come up with -- if you guys can come up with recommendations for us quickly -- soon -- we will -- they will be gratefully received and inform the public policy

conversation that's having inside the Administration.

So, anyway, that's all I wanted is to kick it off. Congratulations to all of you for coming -- for being here. We're very excited that you're here, and I wish you a very, very good day. Thank you.

MR. COWART: Thank you.

MS. HOFFMAN: Does anybody have a quick question for Cathy? Otherwise, we'll move to the next item on the agenda.

(No response.)

MS. HOFFMAN: No? Thank you very much, Cathy.

MS. ZOI: Thanks.

MR. COWART: You're ready to go.

When we talked about today's agenda, one of the topics that came up was the setting, really. And we asked Pat Hoffman if she would, from her perspective, give us a kind of a grounding in how this sits within her office and

how the office sits within DOE. So, I think that's -- I'm looking forward to that. Thank you very much.

MS. HOFFMAN: What I wanted to do today was actually give a little bit of discussion of where the Department is and where the Department is heading strategically.

Secretary Chu tried to bring some innovation in the Department as we move forward. We look at the diversity of the folks here. We recognize there is diversity in the electric sector, and we wanted to represent that diversity when we looked at the reformation of the Advisory Committee.

I'm glad to see everybody here because this is an important way to drive some of the topics that we need to discuss, some of the topics of today, some of the topics that we want to bring up in the future.

So, it's a little bit hard to see. I know you guys have hard copies.

But within the Department of Energy we circle around several different parts of the Department under the Secretary. We have our Power Marketing Administrations, our Energy Information Administration which provides us valuable input into, Number one, an actual entity that actually does work on the electric system in ensuring reliability and providing generation balancing with demand.

We also look at the Energy Information Agency that provides us the statistical background within the Department of Energy. Now the Energy Information Agency is a -- more of an independent administration under the Department of Energy.

We have new activities --

MR. KELLIHER: Pat, could someone focus that? It's hard to read.

MS. HOFFMAN: Oh, I don't know how to focus that.

SPEAKER: Why don't you put your glasses

on?

MS. HOFFMAN: I was going to say I have to put my glasses on.

MS. REDER: It is in your packet if you want to pull it up.

MS. HOFFMAN: I would suggest you just pull it from your packet.

But what the Secretary's trying to do in the Department -- and I guess why I'm bringing it up -- and I won't go through all the boxes in the Department -- is he's trying to integrate different aspects of the Department of Energy.

We are trying to look at ways that we can be more cross functional as we move forward in addressing problems, looking at issues, and looking at opportunities.

So a couple ways he's tried to break down barriers is by bringing in an ARPA-E program -- initiating an ARPA-E program, which is a high-risk technology development program within the Department of Energy that's really taking on

high-risk projects.

And so, what we have is a development from the Office of Science, the high-risk projects that go into the Advanced Project Research Agency for Energy -- ARPA-E. Then we go into the more applied research that it's going to take - so, where office is is taking some of those developments and innovations that are more high risk in ARPA-E, and we're going to take it to more prototypes, development, and demonstration phases.

And then we have integrated more effort on trying -- and we've integrated more aspects of the Department and another focus on how do we cross that bridge into getting things into deployment, to getting them into the marketplace. And one of the activities that has been developed under the General Counsel's office is the Loan Guaranty Program in which we actually are doing loan guaranties to actually help get more technologies into the marketplace.

So, the reason I bring this up is even though our organization focuses on R and D, the Department, as a collective agency, is really trying to span across that whole technology development and deployment cycle. So we want to bring innovation and how we form projects in the United States but also -- as we look at how do we get technologies deployed into the marketplace and how we can create that transition that Cathy was talking about.

We really want to get over that hump in making sure the technologies get integrated into the marketplace and we actually see the deployment occurring.

I did want to recognize that FERC is a dotted line. They're an independent agency that has a link to the Department of Energy. They do not represent the Administration, but they are, once again, part of -- part of the equation as well as we look at the state regulators and the other aspects of any sort of regulatory body over

the electric sector.

Our mission: Our mission is to focus on grid modernization. We consider ourselves technology neutral. We don't look at any preference over one specific type of generation technology, or we don't lay a greater weight over demand response. What we are looking at it reliability of the system, modernization of the infrastructure, and also facilitation recovery from any sort of disturbances that occur on the system.

So we are technology neutral from the generation perspective, but what we want to do is encourage the development of a flexible and reliable system that can be -- that is secure.

So, our focus looks at any sort of technologies that will increase flexibility such as energy storage, demand response, being able to look at any sort of technologies that will alleviate congestion, which may be transmission; it may be demand response; it may be local

generation. We want to keep our toolsets very open to how we can continue to support the development of the electric grid in the United States.

We have three divisions within our organization. We have the Permitting, Siting and Analysis Division, our R and D Division, and our Infrastructure Security and Energy Restoration Division. Those are the three aspects of our organization where we actually execute and implement our research and our activities.

Our budget for 2010 was $168 million; for the 2011 requests on the Hill it is $186 million to give you a sense.

Now that is small in comparison to the Recovery Act which was about four and a half billion -- with a B -- dollars.

I talked about Secretary Chu's interest of creating different partnerships within the building and different financial mechanisms. One of the things we're also trying to do is create

innovation and partnerships outside of the building as we do our projects.

One of the things with the Smart Grid -- we try to do innovative partnerships with different entities in the electric sector as well as the communications sectors in trying to bring folks together.

A landmark of doing the Smart Grid investment grant was actually looking at all the different business models with respect to all the different types of utilities in the utility sector providing electricity whether it was a Muni, or coop, or an IOU, we wanted to make sure that we advanced capabilities in all the sectors of the United States in all the different types of utilities.

So what we're doing is continuing to stimulate partnerships -- partnerships in the energy and electric infrastructure, partnership with the states, partnerships across the scientific and technical institutions.

One of the things the Secretary has done is looked at research hubs which he's tried to pull together the industry, with the universities, with the scientific researchers; and he's trying to pull them all together in one location and giving them free reins to actually go and drive some innovation and some opportunities.

So we've looked at hubs in the solar area as well as I believe there is a -- I believe there's a hub in the energy storage area. So we're trying to develop partnerships that go across traditional bounds.

One of the things with the Interconnection Planning process was trying to create partnerships that go across some of the traditional bounds so that we can actually bring more transparency of information and more discussion in trying to drive solution sets.

We are going to try and improve our analytical and visualization capabilities --

actually would like to improve the visualization across the whole system, have the industry have that capability.

And a strong concern of ours is we'd like to have the focus -- the industry -- to take a little bit of stronger look at resiliency in the sector. As we look at security and resiliency -- it's an important aspect -- it's been in the press. We want to actually take a look at some of those measures and some of those aspects for improving resiliency and some tactics and some strategies on that area.

I'm not going to spend a lot of time on the last slide. Just as a summary, we had four and a half billion for Recovery Act funding. The breakdown was we did $3.4 billion for Smart Grid investment grants. That was a thrust program to get investment in the United States with electric modernization, Smart Grid technologies.

Then we did a $700 million demonstration program. The demonstration program is different

from the investment grant. Programs such the demonstration one to pull the technologies together to create an integrated demonstration that went all the way from vehicles to the transmission system, to taking a total look at Smart Grid demonstration.

We did provide support to the state and local for energy assurance once in going back to resiliency, looking at energy assurance planning, looking at the ability to recover quickly from events. We provided some funding about 10 to 12 million dollars for NIST for interoperability standards because interoperability -- as we move forward, we have to communicate. The technology, the supplier industry has to develop more interoperable devices for the industry.

We did have $80 million for the regional transmission planning activities. Those activities were to look at transmission across the interconnection, look at ways to see if there was synergies on some of the transmission that

could be built, but start taking that longer-term look that the Secretary talked about with respect to 50-year planning -- looking out.

We also had a hundred million dollars for work force development. It is a huge need in the industry today, which I know most of you are very much aware of. In continuing to develop the electric work force we want to be able to stimulate the younger generation to be more adapt and flexible in some of the new technologies that's coming out, whether it's renewable integration, whether it's cyber security but actually have more discipline across the different fields in promoting the work force.

And then the other area that we did invest in is the state public utility commissions, the state energy offices with respect to any regulatory aspects that was going to come across for regulatory assistance for the Recovery Act projects because we wanted to make sure that the states had the assistance, the

technical capabilities to go and analyze some of the decisions that they had to make very quickly for the Recovery Act.

So that's what I wanted to cover today -- a little bit on what our organization is, at least give an update for some of the new members.

If you have any questions, I'll take a couple questions now and then we'll move forward on the agenda.

MR. BARTELS: Good morning. The second -- you mentioned the relationships outside the building; right? So the Secretary of Energy's advisory boards -- I don't know whether you talked about it or can you -- how is that going to work? Is that already active, or --

MS. HOFFMAN: The Secretary's Advisory Board is active. I understand they did have their first meeting. I was not at the first meeting, but in my discussions with the Secretary, what we are going to do is take some of the topics that are discussed at this meeting,

and if any of them rise to a further discussion that could be addressed as well with the Secretary's Advisory Board, we will do so.

MR. COWART: Any other questions?

(No response.)

MR. COWART: All right. Thank you very much.

(Discussion off the record.)

MR. COWART: One of the several topics that we need to discuss later on will be the manners -- the various manners in which the committee will want to communicate its advice to the Department. And it's good to have Pat Hoffman here to help us figure out the most useful ways that we could do that.

I'm reminded - Peggy Welsh reminds me to remind you that refreshments are available in the room next door, as you know, and they're going to be there all day.

And, secondly, I'm told that the special governmental employees -- a fraction of us need

to have an ethics session; and that's going to happen at lunchtime.

So, I think some of you are veterans of it. I'm looking at Ralph. Ralph has gone through it before.

MR. CAVANAGH: It's pervasive.

MR. COWART: And anyway, that's one of the events at lunchtime -- just wanted everybody to be aware that we need to do that.

We have a few minutes on the schedule now to begin the -- you know, our discussion of our priorities. And I just want to emphasize that, of course, for me, as an entirely brand new member of what is now a reconstituted committee, this is just the beginning of a conversation.

And we have done some work ahead of time, as you've seen with the memo on possible near-term study topics -- with the help of -- David Meyers is sitting here as a -- one of the authors of this memo.

And we've also had the opportunity to

discuss some of these topics with a number of folks in the Department, including the Secretary, so that this is actually a -- you know, more than just a first blush look at some of these topics; but we do recognize that, of course, the Committee will, you know, put its own stamp on this and make its own priorities.

I guess in a minute I'll ask Lauren if she has, you know, thoughts to add as well; but I -- and the Subcommittee Chairs may want to chime in on this; but let me just say a few words about where I'm coming from on this.

I'm echoing what we heard from Cathy Zoi a few minutes ago that it seems to me that the overall function of this committee should be focusing on supporting the renewal of the nation's electric infrastructure. That theme is the theme that seems to me to characterize the charge to the Committee.

And, as Under Secretary -- Acting Under Secretary Zoi mentioned, the clean energy

transition is part of that. One way or another, as a nation, we need to renew the electric power infrastructure. And moving it in the direction of a, you know, long-term system that is -- that has a smaller environmental footprint seems to me to be part of the package.

The challenges for the Committee are to decide among all of the many things that we might pay attention to -- first, to two things: What are the principal topics that we want to focus on? What are the most important things where we could actually add value?

And then, secondly, in what manner? How do we act? Do we act by commission in big studies? Do we act by -- as we heard a few minutes ago -- maybe putting together a work team and developing an action memo that is shared with the full Committee and then is delivered in a short burst to the Department?

Do we do other -- do we engage in other kinds of activities? I'm not sure what the full

portfolio of potential activities would be, but it might be reaching out and engaging with a, you know, a selected institutions, selected actors and stakeholders in the industry on a particular point, bringing them to a Committee meeting or having a work team meet with them and then, you know, come up with some -- an arrangement or a memorandum of understanding that advances the ball on important, pending topic.

So, as the day goes on you'll see I have a couple of ideas about that. And I'll stop right there and just say thanks.

I will - been really looking forward to everybody else's thoughts, particularly there's -- from those of you who have been on the Committee before, you probably have great ideas about how, in fact, we can do this.

So, this is a good time for - you know, to turn the mike over to the other appointed -- how do you say Committee Chairs and Subcommittee Chairs in this group. So here's a -- we'll take

it in turn. Lauren?

MS. AZAR: Thank you, Rich.

I am just coming back from Berlin, and I was meeting with the EU Regulators, so I've got two thoughts for this group that I bring back essentially from Berlin.

The first is the United States has a tendency to look at problems and try to devise big solutions. And I frequently try to remind myself of two stories I've heard.

One was back when we were trying to - we were first developing our space program, the United States was trying to figure out how to write in space -- in zero gravity. And we spent millions of dollars developing this really nifty pen that you can buy at the National Space Museum. The Russians took pencils to space.

And a second story that I just heard recently -- and I'm trying to get more information about -- is that there was, I believe a foundation hoping -- wanting Congress to

develop standards on electronic components and Congress did not act on that.

So they went to China, and they went to a manufacturer of an electronics component that's bought a lot in the U.S., and they asked the manufacturer to make one small change in the manufacturing of it which would have reduced the electricity consumption completely. And the manufacturer said, we can do that really easily.

And they said, well, how much more is it going to cost; and they said nothing. And they agreed to do it, and they moved on.

So I would urge this group to try to figure out where we can find the pencils and where we can ask those simple question and not necessarily try to come up with a big, big, big solutions that cost a lot of money.

The second thing I bring from -- from Berlin is natural gas. We talk a lot about electricity. I think most of us, given the fact that shale gases has been a game changer and will

continue to be likely a game changer in the U.S. in the decades to come, we expect natural gas will be one of our bridge fuels to the clean economy that the Under Secretary talked about.

And though we talk about electricity, I urge us to think about supply interruptions. I was a little surprised to hear the EU is actually pretty significantly ahead of us with regards to natural gas planning. We don't do natural gas planning in the United States, I think, from both a security perspective as well as, frankly, just the development of the clean energy economy. We need to start thinking about natural gas, and I -- I'm not sure it can be shoehorned into this committee, but it certainly is significant in relation to thinking about if we're planning on using natural gas as one of our fundamental fuel sources for -- for electricity production, what does that mean in places like Wisconsin, of course, where we use natural gas for heating?

I did find out that there was a

significant issue in Colorado recently where they were diverting the natural gas supplies to the -- to electricity production, and it got cold; and they didn't have enough to heat the houses.

And that's just -- I suspect that that is going to happen more and more, so I would -- hopefully, we can keep our eye not only just on electricity but think about the fuel sources and our interruptions in supply.

I look forward to working with all of you.

MR. COWART: Thanks, Lauren.

As some of you know, this Committee -- by statute, actually -- is required to have two subcommittees -- one on Smart Grids and one on storage.

And we have with us the newly appointed chairs of those two subcommittees. Fred Butler will be the Chair of the Smart Grid Subcommittee; and Ralph Masiello is the Chair of the Energy Storage Subcommittee.

And I wonder if either of you have comments you'd like to make about how you view the work of the Committee going forward. I'm just looking around the room.

Oh, here we go. I didn't see you. Fred.

MR. BUTLER: Thanks, Rich.

I am deeply honored to be on this advisory committee and also to be asked to chair the Smart Grid Subcommittee.

If the goal of this -- and I agree with Rich that -- certainly that one of the central goals is the revitalization of the U.S. electricity system. I think Smart Grid is front and center in that discussion.

I've spent the last four years focusing on Smart Grid as one of the many things a commissioner has to focus on, but five years ago I started reading about this concept of the Smart Grid. And then four years ago NERC was asked by FERC to do a collaborative, which I'm glad to say I helped establish and then co-chaired for three

years.

And coming at it from my perspective, which was a commissioner -- a sitting commissioner in a fairly developed state with a lot of energy concerns on the eastern seaboard in New Jersey. This concept was something that had a lot of potential but also had a lot of sort of pitfalls along the way.

So I started speaking on the issue of Smart Grid and realized that it is -- and I'm a big proponent. Let me just say that from the outset -- a big proponent of Smart Grid.

And in my mind it's the infrastructure for innovation. It's the infrastructure for a lot of the improvements that we all hope to see, but at the same time, it's not going to be as easy as we had originally hoped to deploy and to get up and running the way we'd like to see it.

So -- and some of you have told me that some of the words that I've used are still being used in some places. So maybe they had some

truth to them. We'll see.

I'm -- my goal for this Subcommittee -- and we need volunteers, by the way. I understand we need to have 15 volunteers? So, think about volunteering, please. And I'd certainly really like to have some folks from operating companies on this subcommittee because it's the operating companies -- that's where the rubber hits the road as it were. That's where we are beginning to see some of the pitfalls and some of the challenges that we have to address.

We can talk about the benefits. We can talk about the definitions. We also have to talk about how to overcome some of the challenges that are there.

So that the Committee will be working on that issue, investigating that issue, writing some reports on that issue -- mostly by conference call. There does exist -- we have not ruled out the possibility of an in face -- a face-to-face in-place meeting, but it really is a

very important subject; and I look forward to working with all of you on it. Thanks.

MR. COWART: Ralph?

MR. MASIELLO: Thank you. I echo Fred's comments about the honor and privilege to be here. And I'd like to recognize Brad Roberts, who led the storage effort last year.

Last year the Storage and Smart Grid Subcommittees, I think, were under legislative obligation to prepare a report at the end of the year. And I don't think that that same crisp objective exists today; is that correct?

MR. COWART: It doesn't exist today.

MR. MASIELLO: Yes, so we can define our own goals.

The Department of Energy has funded a wide-ranging number of pilot demonstration and research projects in storage technology, all of which are being evaluated on an ongoing basis.

The technology offers the promise of being a game changer with the huge caveat of if

it works and if it's economical, which are both very much open questions today.

So, I would imagine that one of the goals of the Storage Subcommittee will be to look at how -- how will we know that it really is ready for commercial use for primetime, and what will the requirements in terms of standards and methodologies be that the different state commissions can start to see this as a prudent investment?

Some of you may know that California had legislation this fall, AB 2514 that requires the state utilities to develop plans for storage and factor it into their distribution and transmission engineering. So, I guess as with many things, the principle of California first, obtains this, and we can learn. Dian Grueneich is not here this morning, I guess but certainly could inform us.

Fred's comments -- yes, we need volunteers.

MR. COWART: David Meyer, do you have anything to add?

MR. MEYER: One -- just one brief point.

Some of you will say, I expect to yourselves, if not to others, that there are certain areas you want to get into or that you're interested in, but you look around the table and you don't see some of the expertise that you would like to be able to draw upon. So there is an option.

The Committee has the capacity to consult on an ad hoc basis outside experts of any kind. And so, you should not feel restricted in any way on this particular point. And, indeed, the earlier -- some of the work that was done by the group in its earlier stage or -- did draw upon outside people -- academics in specific areas and others. So that option is there, and feel free to take advantage of it.

MR. COWART: Ralph?

MR. CAVANAGH: Rich and Ralph, just a

quick question on the Storage Committee.

AB 2514 in California started out as something different. It started out as a mandate for every utility to have a specified fraction of total generating capacity in storage. I think this was a dumb idea, and happily, the authors -- in the end -- came to that view.

They came to the view that storage was one of a portfolio of integration solutions, and utilities ought to be evaluating all of -- absolutely ought to be investing in them but that you didn't start out with preconceptions as to what the solutions were or in what proportions.

To me, storage -- unless you're interpreting the phrase so broadly -- and maybe we are -- as to solve the problem -- is one of a portfolio of integration solutions.

Is that our view and attitude? And if so, should we perhaps be capturing all of them in the Subcommittee?

MR. COWART: Well, it's -- I think that's

going to be a question for the Subcommittee, and I expect that the answer would -- of the Subcommittee will be similar to your answer, but I'm not sure.

And I'm guessing, by the way, that this is a topic that we can return to later in the day; but I appreciate your teeing it up.

And then just take one more comment because we need to move on to our next agenda topic.

Michael?

MR. HEYECK: I forgot to mention that I was on the Committee last time. It may be helpful for them to remember is to see the reports we actually did produce last time, particularly the storage and Smart Grid. I think the other committee was on electricity adequacy.

MR. COWART: Okay. And I should note that I expect that we are -- later this afternoon when we -- as we go through these different topics, we're going to find different ways to

organize ourselves to produce the work of this committee. It may be that we create something we call a subcommittee. It may be that we create things that we'll call work teams to address a particular topic. There are any number of ways that we can organize ourselves to provide the best quality advice to the Department; and I don't want to actually close any doors at the moment as with respect to how are we going to do it.

All right. Thank you all.

Our next topic is this -- a topic that I think is one of the principal short-term objectives that we could focus on. And I'll just be very plain about this. This is first on the list of potential study topics because I think it is so important and so current that it is very appropriate for this committee to pay attention to. And that is the question that -- of -- it's written in the text as managing emissions while maintaining reliability. I think we might just

as well call it maintaining reliability while managing emissions.

But in any event, these are do-all goals that the nation needs to address in a very serious way. And I have hopes that this Committee would be able to assist the DOE, and the EPA, and potentially say some things that would be useful or create some -- put some ideas on the table that would be useful to Federal Electricity Regulatory Commission (FERC) and North American Electricity Reliability Corporation (NERC) as well.

So, we're very pleased today to begin by welcoming Gina McCarthy, who is the Assistant Administrator for Air and Radiation at U.S. EPA, and someone that we know well from terrific work in New England and now at the national level. And Gina's going to tee this up. Welcome.

MS. McCARTHY: Thanks, Rich.

I don't think you had to bear your soul to everybody. We all know you pretty well and

know which crazy direction you always head.

So, it's great to be here, and thank you all for giving me the opportunity to speak.

I think we have slides that we can hand out as well. Did you guys bring copies? Everybody has them? Fabulous. That way I don't have to worry about them.

It's exciting to be here. And first of all, I wanted to thank Pat for inviting me - and Cathy Zoi as well. It was great to see her. And things are always changing at DOE, unlike EPA, of course.

I just wanted to let you know that I have Sam Napolitano and Joe Brice in here, so if you ask any technical questions, you can -- I'll phone a friend if that's okay with everybody.

But it is great to see such faces around the table all gathered to such an important task, and I don't want to minimize that at all. I think we have some challenges ahead, and it will be great to have you guys active and thinking

about these issues, so I want to thank you.

And thank you, Mister Chair, for allowing me to be here; and, Vice Chair, I appreciate this opportunity and committee members. And I'm going to look forward to hearing what Emily has to say following me. And I'll try to keep to my timeline, but this happens to be a topic that, as you may guess, is near and dear to my heart.

And the mission of this Committee, as I understand it, is to really focus on how do we modernize the nation's electricity delivery infrastructure. And if that means we're modernizing the power sector, then I want in on this discussion because I think that that is where our joint missions align.

That is what EPA is all about, and it's moving forward with some of the rules that you have heard about.

And Rich Cowart asked me to make sure – and I quote: That we untangle the rhetoric from reality and focus attention on solutions where

needed to deal with this alleged train wreck.

I'll do the best I can, Rich. But I think what you've asked us to do is try to bring our sense of perspective to this issue. And I welcome others because, obviously, we are all in this together to understand how we provide the very best and the most sustainable electricity system that's reliable and affordable to consumers. And we are in that same camp as well and share that mission.

So, let me start by first talking and providing a little bit of perspective. First of all, let's talk about -- if we're talking about reducing air pollution for power plants, which is really what EPA's regulatory agenda is, and we're trying to do that in a way that maintains reliability and affordability in the electricity sector.

Let's talk about what's happened in the past when we have applied our rules. And so what you see before you is basically a slide that

gives you a sense that we believe over the past 40 years -- at least as EPA has been around because today -- this year is actually its 40th birthday. We'll be celebrating next month. We celebrated the 40th of the Clean Air Act this year as well, and many other significant items. It was party city at EPA this year.

And I just wanted you to see since the passage of the Clean Air Act 40 years ago, as a nation, we have continued to make steady progress in cleaning up our air; but we've done it in a way where we applied cost effective technologies while we maintained reliability and affordability. And we continued to grow the economy at the same time.

What I believe you will see is 40 years from now a similar picture. And that is actually our goal, that we continue to make reductions in air pollution while we're sensitive to do that in a way that's cost effective, that maintains reliability, that allows consumers to have

reliable and cost effective power.

Now it's done -- been done through a variety of efforts, and it certainly hasn't just been the public sector. It has been the private sector. And their response to recognize that some of the changes that we have been moving forward have been job opportunities and business opportunities for them.

And the rules themselves have been designed in a way that bring flexibility to the table. But I don't need to tell all of you this because as I'm looking to the crowd -- I mean, the stakeholders that have made all of this possible on the public sector have been the utility commissioners, the consumer advocates, the elected officials, state representatives; the private sector -- we have had utilities, generation developers and owners, transmission developers, environmental advocates, trade associations. Everyone has been involved in making this picture happen.

And we do have a lot to celebrate. We've made tremendous progress. But not to be too overjoyed with the celebration, we have a long way to go.

We actually have to continue to work together because 120 million Americans today live in areas that don't meet the equality standards - a hundred and twenty million Americans. We have to do better.

And what we see is that the American public has been suffering from illnesses and deaths that are absolutely avoidable with current cost effective clean air technologies. And much of this pollution has come from the energy sector, much of it from power plants.

And the Clean Air Act didn't really anticipate that. What it said was is that in 1990s there was requirements under the Act to do a variety of studies that looked at what was appropriate and necessary to promote control of hazardous air pollutants at power plants.

We did all those studies. And now we're worried about the very first rule that will legally stand the test of time that's being considered for proposal next year. Now we are worried -- 20 years later. We could have prepared for this. We will prepare for this.

We also had -- the Clean Air Act said in -- by 2000 that we had to adopt rules to deal with interstate transport of pollution to address our health-based air quality standards.

We're now talking about a transport rule that is on the table that is going to take care of that problem as it sits right now and be a model for continuing to take care of that problem moving forward.

This is, again, 10, 12, 14 years after the Clean Air Act said this was a priority for the American public.

So, none of what we're talking about today is a surprise. None of it just crept up on us. None of it is out of control and running on

a track that's going to run over either the American people, or energy reliability, or anything of that nature. In fact, it's been incredibly deliberate. A train running at this pace couldn't possibly kill any of us.

Now, EPA has a legal obligation to move forward. We have rules that need to be put in place. Now let's talk about these.

These are rules that we are not making up. As I've told you before, the requirements under the Clean Air Act but not only are they requirements under the Clean Air Act, they are actually rules that are required by the courts, many of which are under court deadlines.

And we're not simply deciding that we want to do them, although, I think I can talk this morning about why it makes absolute sense to do them. And, in fact, it would have made sense 10 years ago to do them as well.

But as you can see from this slide, we have a lot of rules that are in the mix that are

actually being enacted over the next couple of years as a result of court orders and settlements and requirements under the law.

And these rules have been carefully walled off by the courts to tell us what we need to do, when we need to do it, and how to get it done.

But what I'd like to tell you is that while those rules are coming up for development over the next two years, that does not mean that these rules are going to be implemented the next day or that all of these public health requirements will come due the next day.

For example, under the transport rule, that is the first time when that rule will take effect is in 2012, and it's a steady reduction over time, using many flexibilities.

If you look at the Utility MACT Rule, that rule is proposed to be finalized in 2012. It's a three-year timeline for implementation with potential for another year.

We have those Ozone Rules in an -- and other air quality standards. Those are implemented over decades of time as we move forward.

So, while these rules are all coming up and we're going to take them and be deliberate and conscientious and use common sense approaches, they're not all going to come up to be paid the next day after those rules are developed.

Now I don't want to go into too many details because you have probably as much familiarity with these rules as I do. I just want to talk to you about the fact that while I have stressed the fact that these are rules that are required under the law, I will tell you that they are rules that should be required under the law. They are rules that have actually impacted significantly public health. They are right to have been highlighted under the Clean Air Act.

So while we have public -- we have public

health benefits that are coming due -- and I want to tell you why in particular this is important for us to think about as you're contemplating infrastructure strategies associated with moving towards clean energy.

Every time that the Clean Air Act has been amended -- and that's in '70, '77, 1990 - it has - it has basically assumed a fundamental principle. And that principle has been that these older, dirtier facilities - power plants -- Would either be cleaned up or they would as a routine basis be replaced by newer, cleaner generation.

Yet to a significant degree, as this slide shows, that's really not been the case. And it's not been the case for many reasons that you probably know as well as I do; but to a significant degree, that means that we have cost effective technologies that are being put into place for the newer facilities that have been around for 35 years. It's like -- it's like

deciding that seatbelts are good for cars, but let's just not worry about all of them right now.

Scrubbers have been around for 35 years. We know how they work. We install them. In fact, for every scrubber installed today, we create 500 to a thousand jobs just to put those scrubbers into place at its peak.

We have requirements that are coming into place, but the good news is we have known technologies that are cost effective that are in place today that can be used to get the job done.

Now about one-third of our coal fleet -- that's a hundred gigawatts -- have yet to apply SO_2 scrubbers.

And many of the uncontrolled units, as you can see, are over 40 years old. This has -- this was never anticipated under the Clean Air Act. This was why, in 2000, they said, hey, you better take a look at that. Do some studies about how to move that forward. And now is the time for us to take this action.

But clean out these older, dirty power plants. I will tell you it is a public health imperative. And I want to talk about that a little bit.

And I will also tell you that many have thought that this move -- this rush towards controls that we have been on since 1970 has -- is now being pushed along because we'd like to address climate change and greenhouse gases.

Now, yes, I would like to address climate change. I would like to find the most cost effective reductions for greenhouse gases, but this is about public health. The greenhouse gases are a happy co-benefit of the reductions that we are looking at.

Let me look at the public health benefits. And I have just a couple of slides, if you'll bear with me.

I want you to understand that the investments that will be required to address these rules do represent significant investment.

There is no question about that. But they will lead to hundREDS of billions of dollars in annual public health benefits.

On the -- just the transport rule alone, as you can see, the annual cost in 2004 will be an estimate $2.8 billion, but the public health benefits in that single year are estimated to be between 120 and 290 billion dollars. Now, that is a cost-benefit analysis that I, for one, feel pretty good about. And that is only one single rule that we are talking about.

And, again, when you're looking at this -- the reductions -- this is the transport rule. The public health benefits will be spread out all across the eastern United States. This is not a single localized issue. This is an issue where air pollution across our country will be reduced, and the public health benefits will be felt all across the country.

Now let's talk about where all these rules lead because many people worry about the

numbers. I kind of worry about where this train is heading because the interesting thing is that all of these rules merge on a small suite of known cost-effective technologies. They all leave in the exact same place and go to the exact same station.

They are not conflicting. They will not make utilities worry – oh, do I do this? Do I do that? You know as well as I what a well-controlled power plant looks like. And that's where these rules are heading.

Now let's look at -- if we have the controls and if the Clean Air Act said to look at this issue of power plants, is it still the thing that we should be focused on? Is it still a priority?

Well, if you look at these numbers, you will see that NO_X emissions, power plants represent somewhere in the vicinity of over half of the NO_X emissions in this country.

For SO_2 it's even larger. And for

greenhouse gas emissions which is a good co-benefit it's similarly large. This remains a huge challenge for this country that remains an opportunity for significant cost-effective reductions.

And so, while we're required to do it, and while the technology has proven, while the cost-benefit is great, it still is the priority issue if you look at where we should be smartly looking at spending our time and investing the public's money.

Now this is also the slide for mercury, but let me try to speed up a little bit and get to today.

So we are where we are. The technologies aren't cheap. I will admit that, but the benefits aren't cheap as well.

What we need to look at now is whether or not it is the right step to take right now. Now I've told you it's required to be taken. I've also told you that the design of the Clean Air

Act basically said we expect this to happen. It just didn't quite happen as quickly and have the turnover that we anticipated.

And I've told you that we have modern controls, and I've told you that we have -- can effectively do this job now. So, what's holding us up? What are we waiting for? Where are the concerns?

Well, I think what we have to do is -- and what I'd like you to help us work on is think about the strategy for moving this forward within the context of investments that are being made and changes that we are already seeing out in the energy market today.

The challenge is to fold in these rules into a clean energy strategy that the President wants, that Congress has been debating, and that this group is effectively trying to look for to steer investments in the smartest way possible.

We are not trying to make pens that you can write in space. We are trying to say that

there are pencils. Use them. And I think it will be effective.

Now let's roll up our sleeves and see what we have to do to get there.

Now, I'm going to reiterate that it's going to take the public and private to get there -- working together. Our rule-makings over the next couple of years will require modernizations of -- mostly it will focus on under-controlled power plants; and it will result in large public health benefits.

We have known this for awhile. The Administration has been meeting -- FERC, DOE, EPA. We have been talking about this issue. We have not been talking about why do these rules have to take place. More, how do they fit in to the investment strategy of this administration moving forward. What signals do we want to send that drive a clean energy economy? And that is not just energy efficiency. That is clean pollution, clean facilities. And we will be able

to make this transition moving forward.

I'd like to tell you that I know that many of you here have been participating in other efforts that are similarly taking place. NARUC has been doing a lot of work in these issues on how we work with the environmental community to really engage them in an effort to move these issues forward.

Over the past couple of months we've had hour-long webinars to talk about the rules that EPA is initiating and how we work with NARUC and others to recognize those issues as a matter of energy policy, not just environmental policy.

And with DOE's support and leadership we've had -- and I think the Vice-Chair would recognize this -- we've had EISPC working on these issues. Twenty-six transmission planning authorities are looking at how we -- how we design a transmission strategy and a Smart Grid strategy, recognizing that these public health benefits are overdue, and they are going to

happen.

And we can work these issues together, but obviously, there's a lot of work to do. And I want to thank many of the people around this table for the work they're doing on this.

Lauren, thank you for the work that you're doing on raising this. I would have to say that I can never be at a table and not recognize Gordon for all of the work that he has done on bringing demand side resources into the market in the northeast. That is exactly the kind of ingenuity and creativity that will drive the kind of transition we need for clean energy.

I know Dian's not here, but if she were, I'd recognize all of the tremendous experience and work that she's done on energy efficiency in California.

I mean -- and I know we have others. I know, Guido, we haven't met, but the work that you're doing on Smart Grid is truly amazing. And I know it's good for the private sector, but it's

also good for the public sector.

And we could go on and on. You guys have this expertise. I need your help. I need your help to look at the future. I need your help to figure out how we can work together so that we can maintain reliability and affordability. And we have to look at how that market is changing and how these rules can feed into the changes that we want -- feed into the changes that we want because we believe that we can modernize. We believe that we have the tools.

Now, I have this slide in here for Rich so that he knows that I haven't forgotten all of the things he's taught me about energy efficiency over the past 10 or 15 years; and I'm going to stop momentarily.

We all know -- I'm going to not spend a lot of time on this. The slide is probably sufficient, but I will tell you that if people are worried about the affordability of our rules, they need to look at what we spend to generate

electricity and what we can save to reduce electricity demand and how that fits into the system.

And, as we see, the lucky thing is that energy efficiency under this administration and the investments have been tremendous.

And Cathy's right. I heard her earlier. The challenge is how do we keep that momentum. And we have great belief that that momentum will be kept moving forward.

Now, the question becomes -- and the smaller question becomes -- with all of our rules, are we going to create a situation where we need to do too much too soon, and can we bear all of the costs associated with that.

Now let me hit to some of those specific issues. First of all, when you look at reliability, we know that we know that we can be very deliberate. We haven't challenged reliability for 40 years. We don't intend to do it over the next 40; but what we have to do is

look at the timelines for installing our control equipment.

What I wanted to show you on this slide was just how effective the private sector has been in installing controls. This slide shows that 20 gigawatt subscribers were installed each and every year between 2008 and 2010. We can make this happen.

What this slide shows you is that you can add a generation when you want to in order to address problems in specific areas with reliability. We have done it before; we can do it again.

So what we need to ask ourselves is do we have the people around the table that can help design the energy strategy moving forward that can keep public health as a component -- and a central component -- of an investment strategy to address reliability and energy sustainability in moving away from fossil fuels and moving towards a clean energy economy. That is the question

that we need to face together.

I think we have shown that we can do this together. I think in the past we've done it. I think in the future we can do it. All we really need to do is recognize that right now we have a changing energy market.

You are now talking about spending billions and billions of dollars on the underpinnings for this new clean energy future. What we are asking at EPA is for you to recognize that the requirements of Congress was that as you looked at the energy future, you kept people first and foremost in that look. They are the not -- not the one moveable object that can be discarded. They have to be central to investments moving forward.

Thank you very much.

MR. COWART: Thanks, Gina.

I think given the time what we should do is hold -- can you stay for a few minute?

MS. McCARTHY: I can.

MR. COWART: Okay. Hold questions and discussion until we've heard our other presenter and then have some questions for the presenters and some discussion among the Committee members.

Our second presenter, I believe, is Emily Fisher?

MS. FISHER: Yes.

MR. COWART: From Edison Electricity Institute (EEI) -- are you going to sit here, or do you want to go up there?

MS. FISHER: If you don't mind, I'll sit up here, actually.

MR. COWART: That's okay.

MS. FISHER: It's probably readily apparent that I'm not Quin Shea. Mr. Shea -- I regret that he can't be with you today. I guess you could say he's our Executive Director of the Environment, and I guess you could say that right now the environment is not agreeing with Quin. He has rather extreme allergies to leaf mold. And the fact that we've had a really warm fall

has rendered him speechless; and if you've met Quin, you realize what a statement that is.

So I am here in his place, and I thank you very much on behalf of the Edison Electric Institute for the opportunity to speak here today and to sort of give our perspective on -- on this conversation about what's going on in the generation fleet. And I think it is really interesting that a committee that opened up with a conversation about your mission being related to the modernization of the grid, that you're talking about generation issues first off.

I mean, obviously the relationship between generation and transmission is pretty clear, and I think it's important that this committee be aware of the things that are going -- going to happen on the generation side as you think about some of the transmission issues.

I wouldn't -- I think I would be remiss if I didn't say that EEI is actively involved on transmission issues, too, that we've been very

engaged with a host of stakeholders, including the Department of Energy, state regulators, NERC, FERC, on grid-related issues related to reliability, related to possible incursions onto our system, cyber attacks, and related to modernizing the grid and making it possible to transmit new resources, renewable resources, and to integrate Smart Grid into our system. So we are working on that side.

I mean, I think a charge that's often leveled at regulatory agencies is that issues can be siloed, and I think that -- you know, that some people look at generations; some people look at transmission; some people look at traditional air pollutants and (inaudible) carbon, and that sort of issue sort of happens at EEI, too; and I realize that I don't spend enough time talking to my colleagues that focus on transmission issues.

That being said once again, thank you very much for the opportunity to be here.

I just want to say that, you know,

Assistant Administrator McCarthy spoke so passionately about public health, and I do believe that that's important for all of you to keep in mind. And it's not something that the utility industry doesn't keep in mind, and I -- what I'd like to do is maybe address a lot of the rhetoric. I think we use a lot shorthand when we talk about regulations, and that maybe leads to some misconceptions about what our goals are, and what our concerns are, and what we think the challenges are.

This is just a quick outline of what I'd like to talk about -- sort of industry prism. Prism is a Quin word. Really, the subtext is talking about where we are here in 2010. And I guess -- then the rest of the presentation, if you want to send them up that way is how do we get to 2020. What does 2020 look like, and how do we get there?

Quin is fond of saying that if he got all the right people in the right room together,

that, you know, environmental groups, regulators, people concerned about reliability, that we could all probably agree on what we think the fleet should look like in 2020 and for sure by 2030. And the real issue is how do we get from here to there. So that's really what we're talking about today.

Our objectives always to minimize economic impact to our consumers and to continue environmental improvements. I think it's clear that when EPA has passed final regulations that we have met the challenge and that our emissions, particularly of SO_2 and NO_X, have gone down dramatically since 1990. Since the Clean Air Act amendments of 1990, we've risen to the challenge to reduce those emissions. And it is our firm commitment to continue to meet the requirements that EPA places upon the fleet.

Always to maintain system reliability -- I mean, we have a good history of doing that, and we like to do that. People like it when the

lights turn on when they flick the switch.

And often when we talk about reliability in the context of these rule-makings we're not talking about blackouts or things like that. We're talking about making sure that we make the transition in an orderly way to obviate any potential reliability implications.

We believe it's important to maintain fuel diversity options. The slide -- the last slide that the Assistant Administrator put up showed just the huge number of megawatts and gigawatts that we put on the system recently of natural gas. That had some implications that need to be talked about.

We're always in the market for development and deployment of new technologies -- both controlled technologies and new generation technologies.

Obtaining access to capital and cost recovery -- these are important. This goes up to Bullet Number 1, the minimizing economic impacts

to consumers. We are largely a regulated entity, and we operate under the regulatory compact where we make investments and then we make those investments back through our rates. And so, doing that and in a way that minimizes increased rates to consumers is important to us.

And then, you know, negotiating the myriad political landscapes. That's also a Quinism. I think you can probably, you know, insert what you want there.

But right at the start I'd like to say that the electric power industry is not a monolith and that I'm going to be talking in generalizations. And that doesn't necessarily mean that every single one of EEI as member companies agrees with every single thing I'm about to say.

And I think I'd like to take you through a couple of slides that sort of show you where we are today, and it'll become quickly apparent why not everyone agrees on everything. I'm sure

you're shocked that a whole bunch of big companies don't agree on everything.

So, where are we in 2010? These are sort of the strategic elements that go into our thought process. The recession has dampened demand for electricity. We expect it to rebound. We hope it will rebound and grow. I mean, that's the sign of a health economy -- increased demand for electricity. Obviously increased demand doesn't mean that we're not paying attention to efforts on the energy efficiency side, but growing demand is good for the economy.

We are in the beginning of a major investment cycle as the Assistant Administrator pointed out. We're about to spend a lot of money on environmental capital expenditures to install control technologies and to build and deploy new technologies.

One of the big things that is affecting our industry right now is the renewable electricity standards that 29 states and the

District of Columbia have. And in order to meet those standards, we are building more renewable technologies.

We also are looking at spending quite a lot of money on infrastructure and improvements to the grid. And Smart Grid and, you know, transmission to get the renewable from here to there -- all that is very expensive.

We would like to address GHG emissions. I think one of the things that the Administrator didn't talk about or didn't focus on was greenhouse gas emissions. And as we plan to install control technologies on existing units, whether or not we will eventually have to do something else to those units to address greenhouse gases affects the investment decisions.

And then Wall Street restructuring - access to capital is harder than it used to be, and things are more expensive than it used to be.

We recently had some Wall Street people

come into EEI, and I was -- I think maybe more surprised than I should have been to learn that most utilities are Triple B minus rated these days, which just means that capital is more expensive for us than it used to be.

But where are we now? This is the portfolio as of 2009. This is on a national level. We're less than 50 percent coal but close. Natural gas is about a quarter. Nuclear,about 20 percent. And then there are non-hydro and hydro renewable, which get up to about 10 percent.

Actually, I was going through my slides this morning. I don't know what the other is. I have to find that out.

But I think, really, the real story here is at the regional level because the mix is very different region to region. Just pick a color and look at it as you go around, and you'll see the things very differently.

Coal happens to be purple, and natural

gas is orange. And then if you look on the west, you'll see that there's a lot of hydro. It just means that different rules impact different utilities in different parts of the country differently.

We talk a lot about the fleet and how old it is and how well controlled it is. And I think this slide is consistent with what the Assistant Administrator said that you look at the bulk of our units -- they're between 30 and 60 years old. And you can see by their emissions which are up there in -- for CO_2, SO_2, and NO_X -- that those are work horses. Those are the base load plants that -- that, you know, emissions are on some level directly related to how much you run because it's how much fuel you use. So you can see that those are the ones that we're using more often.

The Assistant Administrator talked about how the Clean Air Act didn't expect that these plants would be living this long, but I think

that we did. Our investments in these sorts of technologies and generation technologies are meant to be on a longer time scale than maybe other industries anticipate.

You know, we expect units to run for 30, 40, or 50 years; although I am still amazed that we have 70-year-old facilities. I thought that was fascinating the first time I saw it.

So, this is -- we try nicely call it the EPA regulatory pathway, but other people do call it the train wreck. It is -- it is, I guess, like I said, there lots of shorthands that maybe lead people to think that people are more strident in their positions than they actually are. SO this is the train wreck slide, and these are the different regulations that -- that we expect to be proposed and then finalized between -- the timeline starts at 2008 and goes to about 2017.

And I think it's correct to say that these weren't unexpected, that we knew that they

were coming, but we sort of have this sort of interesting catch-22, and that is there is a limit to what we can do in advance of final rules when it comes to cost recovery.

You know, utilities, I think, are different from other big businesses. And that is we are fairly risk averse, and that is because we have to go to regulators and ask for cost recovery. And regulators don't tend to give us cost recovery unless something has been mandated.

So, if a rule isn't final, then you get the question from your regulator then why are you doing this because the regulator largely is concerned about the economic impacts of the rules.

So, this is a carbon story, which is not necessarily applicable, but I think it's sort of unfortunate that the State of Virginia has recently decided to deny some cost recovery to American Electric Power Company on what they are doing in terms of carbon capture and storage in

West Virginia.

They have undertaken, you know, the first fully integrated project that goes from capture to transport to storage at one of their facilities in West Virginia. And some of the power from that facility does serve customers in Virginia, and they sought some rate recovery. And the Virginia Commission was like, this isn't required, so we're not going to do it. We're not going to let you get rate recovery. Okay, so they are bearing the cost of that, you know, and they're getting lots of money from DOE to help them with that, but they are bearing a lot of those costs on their own.

And I think that just serves to sort of -- sort of give you an example of where we find ourselves and why, you know -- these -- it's true. Sort of two (inaudible) exist. They're proven technologies that can be installed, but, you know, why have some plants not been controlled? Because it is difficult in certain

areas if there is no cost recovery that's going to be forthcoming.

MR. COWART: You need to (inaudible).

MS. FISHER: Okay. Final legislation -- we didn't get it. We would have liked it. It would have given us a lot of certainty. EEI was very actively engaged with a lot of different stakeholders to try and get certainty in this area. And we really thought that legislation was the best way to do it -- to achieve almost all the things that we've talked about today to reduce carbon emissions, to make some improvements to both the transmission system and to make some massive, you know, transformation of the generation technologies that we currently use.

I don't think it's coming, so we're sort of left with trying to do what we can with the rules that we have.

I'm going to skip over some of these.

I think that I've pretty much said this

already, so what do we need to do? We need to comply with EPA regulations, which is what we want to do, which is what we have a history of doing.

It could cost up to $2 billion a year in capital expenditures by 2015 to install control technologies to satisfy the coming requirements.

We're a pretty capital intensive industry. We already spend about $80 billion annually. And as the Assistant Administrator said, this is going to cost something.

I don't think the question is can it be raised. We can raise the money. The question, as I said before, is at what cost. For us, the lack of a carbon policy makes decisions difficult. It can make sense to retrofit certain plants -- some of these older plants -- to make them the most well-controlled plants in terms of traditional pollutants; but it could not make sense later if you find out what you need to do for carbon to have made that decision. And we'd

like to avoid stranded investments.

So we're just looking for a way to sort of connect all the dots together so that we can make the right and the best decisions.

So the next 10 years are critical. You know, I think EEI has worked hard with the Administration, with EPA, and with DOE to talk about our concerns and to work together. I mean, like I said, we tend to be siloed. I think everyone has that charge leveled against them these days. I think we all need to work together about sort of looking at the impacts of the rules as a coordinated whole.

New technology development is critical in our industry. Storage would make a huge difference in terms of being able to integrate renewable onto our system more reliability -- more reliably. We have concerns about, you know, base load.

When it comes to installing all the retrofits that we need to do, we're just making -

- we just want to make sure we have enough material, labor, and time to do it so that it doesn't necessarily become more expensive than it needs to.

For building new plants and getting permits is very time consuming. EPA recently put out its IPM 4.10, and I was sort of shocked that they thought we could get a new plant on line in 26 months because that doesn't happen. And it's not just permitting. It's just -- construction takes longer than that.

So one of the things that we're looking at -- and Quin would say it might be a little pie in the sky, but we are looking at what we call a generation fleet initiative. Is there another way to get from here to there that might take into account more of the issues -- you know, a path to avoid the quote/unquote train wreck. You know, we'd like to be able to look at traditional pollutants and CO_2. Our CEOs are actively engaged on this. And maybe it won't come to

anything, but they do think it's worth their while to try and think about doing things in a different way. And that doesn't mean they're not planning to comply with what EPA is preparing to propose and finalize, but they would like to think of -- is there a better way of looking at all of these issues more holistically.

And there might be a time in the future where we come to this group or to the Department of Energy, EPA, Congress, other stakeholders, environmental groups to talk about some of our ideas. And we certainly would appreciate your input on -- on are there other ways, are there better ways, what can we do to smooth this transition because we are in the middle of a transition of our generation fleet.

And I certainly appreciate the opportunity to talk to you this morning, and I look forward to any questions you might have.

MR. COWART: Thank you.

MS. FISHER: Oh, and there's a ridiculous

number of slides after this in case you have any questions.

MR. COWART: Thank you very much.

Now, questions for either of the speakers first; and then let's initiate a little Committee conversation about what we might want to do in this topic area.

And I'll ask you to do this with your card. Thanks. Ralph.

MR. CAVANAGH: Emily, I just -- this is just to try and drill down in a factual what I think is just maybe a factual disagreement or may not be.

You think - EEI thinks that the cost of complying with the various EPA regulations may be $200 billion per year by 2015?

MS. FISHER: We've -- I think there've been several like publicly provided estimates of what they think the control technology installation cost would be. There have been three or four of them have come out recently.

And NERC has come out with some -- Bernstein and some others.

And they say that that's within sort of the average of those numbers that have been given publicly. And this is looking at the installation of the scrubbers and then --

MR. CAVANAGH: Is that a cumulative number through 2015, or is that what you're estimating?

MS. FISHER: No, it's a cumulative number.

MR. CAVANAGH: Okay.

MS. FISHER: It's a cumulative number.

MR. CAVANAGH: So that would be - that's the EEI estimate of what all of the things that Gina was talking about would cost the industry in terms of capital investment?

MS. FISHER: Like I said, I think that's more of a -- a reflection of the publicly available information on that that's been put out by various groups in the last, I would say, six

months to a year.

MR. CAVANAGH: Okay. And then I thought, Gina, you had -- Gina -- the number that Gina gave was more like $2 billion; so is that -- is the range of disagreement that big?

MS. FISHER: I think -- and obviously, the Assistant Administrator can speak for herself. I think she was actually just speaking about the Transport Rule whereas we were talking about the Transport Rule --

MR. CAVANAGH: All the rules.

MS. FISHER: All the rules. Ozone --

MR. CAVANAGH: So, I just -- if Gina could tell us what she thinks the number is just so we have a sense --

MS. McCARTHY: Sure.

MR. CAVANAGH: -- of what the -- what the actual disparity is in --

MS. McCARTHY: Actually, the -- part of the problem is is -- for Ralph -- that the estimates are being made on rules that have not

even yet been proposed.

MR. CAVANAGH: Right.

MS. McCARTHY: So I can't give you an estimate. Nobody can. And I think what we see is what -- what we're seeing are projections of what I would call worst-case scenarios based on what we might propose and what we might end up making in terms of a decision.

MR. CAVANAGH: Okay.

MS. McCARTHY: So, even for the four largest -- you know, rules that we have that -- that folks are looking at, two of them have not even been proposed. And, in fact, I think some of these costs are projected on EPA actually requiring every coal facility over the 31 states -- every unit to have a new scrubber.

Now I think we all know that many of those units are for market reasons not really going to be around long enough to have to do anything. So, we really need to do, I think, a better job at looking at what those costs are and

figuring that out together.

MR. CAVANAGH: Okay.

MS. FISHER: And as a point of clarification, it doesn't just -- those numbers from our perspective don't just include the air rules. They also include dealing with coal ash, which could, you know -- transitioning ponds to dry handling is very expensive. And it also addresses 316(b), assuming that you would have to install closed cooling towers to address -- including not just the coal fleet but also nuclear units which is also very expensive.

MR. COWART: I would -- a request from the transcriber. If everyone could make sure to speak clearly and closely to your mike, they were having a hard time hearing some of the dialog just now.

I've -- I'm trying to take note of everybody's cards more or less in the order that they went up, so I'm going to -- I think Barry was first, so I'll start with him and then come

around.

I see the cards.

MR. SMITHERMAN: Great. Thank you.

Well, Gina, it's nice to make your acquaintance since I think we are litigants on a number of cases.

(Laughter.)

MR. SMITHERMAN: Now we can --

MS. McCARTHY: I noticed that.

MR. SMITHERMAN: Now we can put a face with a name -- each of us.

MS. McCARTHY: You could say that to a lot of people though.

(Laughter.)

MR. SMITHERMAN: Well, I was hoping we would be in the top position, but I do want to follow-up with you offline on a number of issues, but, Emily, I have seen an advance copy of the next prism release from EEI. And what I found really intriguing about it is it takes a regional approach to looking at some of these issues.

And I think your slide which showed the fuel resource mix by region is a really important thing to focus on because each region of the country has a unique set of resources that I think we fail to sometimes take into consideration as we look at these problems going forward.

I would like for us to think about it on a regional basis as one possible path because I think it's really going to be difficult to get the entire country to come to consensus on addressing some of these issues, but rather, the Midwest and the panhandle of Texas has a lot of wind; the southeast has a lot of trees; California and Arizona have a lot of sun. You know, let's -- as the French would say, viva la difference. Let's be cognizant of the differences and try to take advantage of them.

So, I don't know when that work product is going to be available, but if you can get it out to this group as soon as possible, I thought

it was really quite important.

MS. FISHER: I wish we could take credit for that. It's actually the Electric Power Research Institute that does that; but we'd be happy to work with them to make sure that you all get copies of that as soon as possible.

MR. COWART: I think Tom was next.

MR. SLOAN: Thank you. I got a question for Gina. I mean, the focus is always on coal plants, but I know that in my part of the country we've got some 40 and 50-year-old gas plants that are not necessarily the most efficient.

Are we going to be addressing those issues as well through your regulations? And if so, when or how -- I mean, that's just not a discussion I've heard.

MS. McCARTHY: Yeah, I think we tend to focus on coal because it tends to be the one that's most closely looked at as requiring significant investment and looking at -- at what's happening with coal facilities in light of

just changes in the market. So that's the one that we spend a great deal of time on.

But most of our -- our requirements will be across the board. They will tend, I think to impact coal more and more quickly, but I think the good news is -- and I don't disagree with you, Barry, so we have one thing we agree with. I do think a lot of this is going to be a regional issue.

And one of the good things and one of the -- I'll tell you, one of the most disturbing things about the discussion of climate on the Hill for me, personally, has been the idea that Cap and Trade is a problem. If you look at what we have done with our rules, there's no rule that's more successful than our Acid Rain Program. I mean, for every buck we spent, we got 40 bucks in benefits. And it was absolutely remarkable how you could design a program that allowed the most cost effective solutions to get the public health reductions you were looking

for. That is essentially a Cap and Trade program.

And so, what -- what you might expect to get with our Transport Rule and others are -- are opportunities to look at reductions at a variety of different types of facilities to meet the needs moving forward.

But the biggest challenge -- one of the biggest challenges that we have on the regulation side is not necessarily this transport relative to NO_X and SO_X, but it's more the hazardous air pollutants.

The Toxics Rules which the courts have very clearly told us can't use the same Cap and Trade system if you will. And so we will be looking at -- at how we get at complying with what the courts and the law have told us and how we do that in a cost-effective way.

It does present a bigger challenge, and it will be a bigger challenge for coal than it will be for natural gas.

But, again, we don't anticipate that as a result of that every single unit (inaudible) to have a scrubber on it as it currently exists.

MR. COWART: Sonny?

MR. POPOWSKY: Thanks, Rich. Gina, I also have a question for you. I'm Sonny Popowsky of Pennsylvania Consumer Advocate. And thank you for your outstanding presentation.

I wrote down -- you said that greenhouse gas reduction -- I wrote it down -— you said would be a happy co-benefit of some of the things you're doing. It seems to me, though that that's true of some of our solutions, but it's not true of all of our solutions.

I guess like when you add a scrubber, I understand that you actually reduce efficiency, increase CO_2 emissions. Energy efficiency, on the other hand, obviously works well for both.

So, what is your sort of working assumption now at EPA in terms of CO_2 because I just don't know how you go about doing your job

now given the current situation? What is it that you think is – what is your working assumption as you try to address the SO_2, NO_X, and mercury problems? What do you think – what are you thinking's going to happen with S – CO_2?

MS. McCARTHY: We know that there are -- there are technology choices which will in some instance increase CO_2. Overall we think it's going to be extremely beneficial to move these rules forward.

But I will tell you -- our working assumption is that, Number one -- and this is where perhaps Emily and I can agree most -- is we still think Congress needs to look at this issue and provide comprehensive legislation.

I agree with her that this is an issue that deserves that type of attention. It is better handled in that type of a larger venue.

I don't agree, however, that in that context you need to look at our Clean Air Act rules that deal with public health and think that

those need to follow a greenhouse gas timeline. They have been deferred long enough.

And so what I -- what we are doing is we're moving forward with the regulation of greenhouse gases. Come January 2nd, the large facilities that will be going through the Clean Air Act best available control technology process through our PSD program will be required to look at greenhouse gases and we'll keep moving that issue forward.

Come next July it will be the very largest of facilities can come in as a result of greenhouse gas emissions only into that process, and we'll move that through. We're working with the states and with the regions to make sure that this can be done seamlessly.

So, as of January 2nd, greenhouse gases are regulated. We'll be looking at, again, the most cost effective technologies.

In many ways that system will drive towards efficiency issues because many of the

technologies like carbon capture and sequestration, they do have high price tags. They will likely not get through the best available control technology system without being weeded out at some level in terms of whether or not they're available from a cost perspective. And I think that's entirely consistent with the President's Task Force on CCS. That's where they came out. It's available. It's really expensive. Thank you, DOE, for demonstrating and moving these systems forward. Over time I think we'll get over that hurdle as well. SO we're looking at that.

You know, in the meantime we're trying to work with you and others to understand how we can meet the public health needs of the Clean Air Act in ways that don't cause the dilemma that you're talking about.

If the best solution is to look at our transmission area and to deal with load pocket problems through transmission, through energy

efficiency, through demand reduction, what you can look forward to are solutions that are cost effective, not just for the facilities but for consumers.

And I think it's funny that's where you've been all your life that I've known you, and it's -- we have to bring that into the picture. We have to understand it. And I think we are willing and wanting to have our rules lay out in a way that maximizes those opportunities.

MR. COWART: We know (inaudible) Bob Curry?

MR. CURRY: Thanks. I'm Bob Curry from New York.

I think we should understand that the figures that Ralph questioned Emily about the cumulative over $200 billion is derived from several Wall Street studies that, of course, may be slightly self-interested in the fees that can be made from raising the money to do that. Just an observation. I'm from New York, so I observe

these things.

It really though is point to the intersection of the need for a build-out whether or not we have the climate concerns -- a build-out to replace the aging infrastructure and then feather in the climactic concerns, the EPA's concerns, the desire to focus on energy efficiency, demand side management, new sources of generation, enhanced new sources of transmission, relocations of transmission.

And I raise for discussion the question of how can we best inform the advice that we are seeking to render here by the costs involved. They lurk behind every discussion, every consideration. It's difficult to see how we can feather it in without making some choices. It's like the cold spaghetti left over from the night before. You can't tease out the replacement from the environmentally driven decisions.

So, I'm sort of asking a general question if anyone has observations on it.

MR. COWART: Thank you. Joe Kelliher.

MR. KELLIHER: Thanks, Rich.

I have a quick question and a quick comment. And the question is to (inaudible) administrator.

The EEI slides say with respect to the generation fleet initiative likely would require Congressional action. Do you agree with that? Is the generation fleet initiative something you think you can do under current law, or would it require a change in the law?

MS. McCARTHY: Can you explain to me everything involved in generation --

MR. KELLIHER: Well --

MS. McCARTHY: -- fleet generation?

MR. KELLIHER: -- I can think --

MS. FISHER: I was just going to say it depends on what it is. It's just --

MR. KELLIHER: Right. Okay.

MS. FISHER: I mean, I -- and I don't presume to be the expert on the Clean Air Act,

but I mean, I think we've seen, as the Assistant Administrator pointed out, when EPA has tried to do things that maybe play with the edge of its authority under the Clean Air Act, the courts have not been so friendly with respect to the Clean Air Mercury Rule.

You know, the fact that the Clean Air Interstate Rule didn't really survive legal scrutiny -- these were good rules that were good for making reductions and good for industry in that it was a little bit more flexible in terms of timing and allowing, you know, the most cost effective reductions to be made; but they didn't fit clearly within the confines of the Act.

And so I just think that everyone -- regardless of what actually would go into a Generation Plan initiative -- and you know probably fairly well, Joe, that like these are nascent conversations with EEI that everyone is concerned about making sure that we would -- if we came up with something, that it would survive

that scrutiny because I don't think anyone wants to go into a situation where we make investments based on some scheme that ultimately is not enforceable.

I know that's a key core thing for the Agency is to follow the law.

MS. McCARTHY: I think many ways, Mr. Kelliher, and I know that you have worked on these issues for a long time and -- in that I think that the key, frankly, is do we -- do we start now to take a look at where we want to end up; or do we wait until the rules are in place and then sort of think -- sit around and say, geez, only three years?

MR. KELLIHER: Uh-huh.

MS. McCARTHY: You know, there's a lot more than three years now, and there's an ability to get more time. And I think if -- you know, if -- if the quiet truth be known, I don't -- I don't -- I've been working in this world a long time. I can never remember when we have ever

shut down an electricity generating unit(EGU) that had a -- that posed a reliability concern because, frankly, reliable energy is as big a deal for public health as breathing clean air, you know.

So the question is how do we engage this discussion where we are now. And I don't blame anybody for going to Congress. Congress has their own role to play. They can make their decisions, but I am not -- we cannot, I think, afford to have that be the only venue to discuss this. We need to really plan for what we know is coming in the best way that we can.

MR. KELLIHER: Thanks. And my brief comment is more just not seeing how -- this is arguably the most important subject facing the industry right now -- how to achieve significant air emissions reductions at a reasonable cost while assuring reliability.

But it seems to be -- EPA is the decision maker in that area, not the Department. And so I

don't -- I'm a linear person, which is a -- not always a strength. And to me it seems advising the Department on a matter that is wholly committed to EPA's decision making seems -- at least there's a -- there's one bank shot involved in getting the advice to EPA. If this were an advisory committee at EPA, I think we should say this is probably the only thing we should be working on, but it's not. So I'm not sure it's efficient for us to be advising the Department on something committed to EPA's discretion.

MR. COWART: Let me chime in then because this was -- I -- to be kind to everybody, I put my own car up, but I'll give you a thought.

And this is a thought that we have been discussing with folks at the Department and which sort of goes like this: As you heard from the Assistant Administrator, EPA has no interest and has flexibility within the administration of its rules to -- there are a variety of flexibility devices that the EPA can use to move forward with

its obligations while also respecting the reliability imperative that I'm sure everybody around this table feels as strongly about it or even more strongly than Gina may feel.

That – okay. So, the Admin -- so, EPA has the opportunity to use flexibility devices to help to resolve reliability crunches.

One -- in using or exercising that flexibility EPA might very well be interested in hearing from the Department of Energy as to -- on a forwards-looking basis as to the kinds of flexibility solutions that would be appropriate in particular circumstances or an identification of, you know, how bad these problems really are and can we -- on a looking-forwards basis can the Department help EPA to identify where their crunches are going to be and what the possible solutions might be.

And if DOE and EPA can work together on that, it is possible that they could put in place a structure for dealing with potential problems

that would allow everybody to go forward with greater certainty.

That's the idea that we've been discussing within the Department. I'm not -- I don't think anybody's said anything formal about it; and it's an idea that I'd like to put in front of the Committee.

So, I'm trying to answer your question. What can DOE do? DOE can help EPA by helping to identify potential crunches and identify potential solutions.

MS. McCARTHY: I guess the only other thing I was going to say is I don't agree that EPA is the only decision maker. We're the decision maker on our rules and the basis of what Congress has said.

But DOE is -- and FERC and others are decision makers in this. And when we regulate industry sectors, clearly the industry participates in a rigorous way to make sure that our rules come out as flexible as they need to be

and in a way that they believe drives their industry forward in the most cost effective and economically viable way.

That's all I'm asking for the energy world to think about is it's not like you're sitting here spending no money. There are other reasons why you're investing in transmission. There's other -- it's not as if reliability has been resolved. You know you have areas where there are reliability problems where you can anticipate the need for investment.

All I am suggesting is that when you do that; don't make our rules the only thing that isn't certain. Why don't we just say plug that into the equation; let's see if it comes out in a place where it meets our needs. We can actually make public health improvements in a timely way, and we've actually delivered, I think, for the American public what Congress actually intended, which is that they don't choose between breathing clean air and turning the lights on.

And that's really -- I know it sounds very naïve. I actually don't think it's naïve at all. I think if you put in context what you're expecting us to -- what you're expecting our rules to cost in context with what it costs to generate electricity, it's actually -- there are just monies being spent.

All I'm suggesting is how you spend it can actually provide the best decision opportunities for all of us.

MR. COWART: So let me just inject here just a note about the time. We're past our time for this session. I'm loving this conversation, and I, personally, don't want to cut it off; but I want to sort of call on a couple more people and then maybe we could take our break, and I'm sure we'll have the chance to come back to this later.

So, I know Lauren wants to speak, and I don't know if -- David, you put your card down. Do you want to wait, or do you want to go?

MR. NEVIUS: Just a quick comment as a follow-on to something you said about how DOE can help.

I think one example of how DOE and Pat's office can help is something that we worked with them on with respect to 316(b) and the Clean Water Act where we did some technical analysis, and, in fact, from a reliability impact perspective, it dwarfs the potential impacts of these other clean air issues that the Assistant Administrator was talking about.

MR. COWART: Okay. Thank you. Lauren?

MS. AZAR: Yeah, to sort of pull all the comments together, when evaluating EPA regs, we aren't one nation; we're a confederation of 50 states. And I would recommend that not only do we think about this on a regional basis but we think about it on a state-by-state basis because that would recognize both the resource differences as well as the regulatory differences which are quite significant in how we deal with

these things.

One of the things this group may want to consider -- and this is how EPA can be implementing their regs -- is a plant-by-plant approach rather than a blanket approach because by doing a plant-by-plant approach, we literally can try to smooth out the economic inequities that are going to be created by a -- the EPA regs, while simultaneously achieving the goals that the EPA wants to do because I do think it's the -- it's the regulatory differences, the resource differences that ultimately result in the economic inequities which is why everybody runs to Congress and tries to kill these things.

And if we can figure out a way to do this to minimize the economic inequities -- in other words, recognizing that we are 50 confederated states, I think we'll be much more successful in the end.

MR. COWART: All right. I see there's four more cards up. I'd like us to take a break.

Are you-all okay with that?

(No response.)

MR. COWART: Richard, you look – you look intense.

MR. VAGUE: I would simply request that we get an electronic copy of the excellent presentations that we've heard thus far today.

I would echo Chairman Smitherman's comment about the regional differences in fuel mix but have an electronic copy of that slide would be very helpful.

MR. COWART: All right. Thank you.

I should announce for members of the public as well that all of the presentations from all of our meetings will be posted electronically about a week after the meeting at www.oe.energy.gov/eac. And they'll be circulated to the Committee members in -- directly.

And let's -- we're going to take a break until quarter till, and then the -- and I should let everybody know that for members of the

Committee there are refreshments in the other room, but these are for members of the Committee only I am told. Thank you.

(Brief recess.)

MR. COWART: The time has -- the time has come. Let's get going.

(Pause.)

Are you still -- are you still up?

(Inaudible.)

MR. COWART: Okay. Because we -- I will take your comment, and then we'll go to the next thing.

A couple of -- a couple of announcements. For members of the public I've been asked to let you know that if you're looking for a cup of coffee or whatever, there is a deli across the lobby of this building, and that's all I know about it.

SPEAKER: Mary's Café.

MR. COWART: Mary's Café is there and apparently open for business.

A second note, Tom Sloan asked the question whether all of the members of this Committee could have the phone numbers and e-mail addresses of all the other members of the Committee to make it easy to communicate with each other. And that certainly seems like a sensible thing to me, but so far we've been protecting you by not circulating all of your contact information to everybody.

So, let me ask the members, as you're sitting here, should we create a list of all the members and their contact info and all that stuff and circulate it to all the other members?

(Many reply, "Yes.")

MR. COWART: Okay. Now we have one -- we have one comment still pending from the last go round, and so I'll ask Rick to chime in; and then we're going to turn to this renewables topic.

MR. BOWEN: Yeah, thanks. And I'll be brief. I -- and I was particularly interested in responding to the EPA's position on things. And

I do this from a consumer's perspective and then tie it in to what we're really here to talk about which is transmission.

I think there is -- I worry about the positioning of people that we know what's coming and we should be making changes under that presumption. I would say that as a consumer -- and this is to speak to EEI's position -- I do not want the utilities of this nation presuming anything and making those expenditures only because I don't know what that means.

And what I mean by that, as a person whose own generation for 35 plus years, personally, I would say that a 30-year-old coal plant that may want to put on scrubbers because it's the right thing to do doesn't know how it's going to deal with CO_2. I worry that they would make a significant expenditure in order to do that only to -- 10 years from now -- determine that they can't deal with CO_2 and can't meet those obligations, as a result of that have to

close down after having spent those hundREDS of millions of dollars.

So, I pay the bill for that. We -- you know, we buy over 10,000 megawatts of electricity here in the United States. I am, frankly, not particularly interested in carrying that bill when I don't know what the long-term ramifications of that are.

I think how that fits into the decisions that are going to be impacted by things that we do here is that then means that this whole mix -- as you saw up there and Barry and others pointed out -- is different in every parts of the country.

I worry about picking winners and losers because any time you go through that theory, then people are going to stand up and try to protect their interest as we'll see in the Midwest and other places that have significant coal; but what worries me even further about that is that change in mix -- if it's not done correctly and over

time -- most of us have seen what happened in the natural gas changes over 35 years when we influxed significant amount of changes in fuel in different regions, we forgot -- and I think Ms. Azar brought this up -- the infrastructure that goes behind that. And that is things like natural gas and the capability of us to get natural gas in some regions where that infrastructure does not exist.

Oh, so there's things that go behind that. That also means that you cannot assume, like I've seen in some reports as of recently that you can put generation plants where the old coal plants were. First of all, most of those are very close to load centers now because the communities moved out to where the plants are over time. And people are just not going to let you do that.

So, it's -- I think that's false to presume that you're going to brownfield gas plants -- the gas lines may not be anywhere near

that. That's going to impact transmission from all of our perspective because just like the renewable, sometimes they're not where -- they're not where the transmission is, and we have to rebuild it or really upgrade it to carry that.

And so I think it is a big -- there is a lot of moving pieces to this that we have to consider. And their role as EPA and the role of EEIN -- I should say the utilities in general is very significant on what it plays to the transmission part that we're talking about. So we have to -- you know, we have to consider all those pieces, and we have to consider the cost of those because consumption will clearly change based on that cost. And I will tell you that as a consumer. It will change.

MR. KRAPELS: (Inaudible.) -- 30 seconds about the missing commission -- and that's FERC. And one of the things that I'd like to ask my fellow panelists to think a little bit about as we discuss this is the current Notice of Proposed

Rule Making that FERC has in front of all of us. It could include consideration of environmental -- not just environmental policies but also environmental constraints.

And at some point, Gordon, I'd love to hear how an ISO will try to deal with the issues that the EPA brought up.

MR. COWART: Thank you. We're going to have an opportunity at the very end of the day -- and I'm sure over the next months -- to try to weigh all these different issues against each other in terms of the priorities of this committee.

Now I'd like to jump into another big thorny one, the integration of renewable in the U.S. electric grid -- and just going to launch immediately by asking Sam Baldwin and Walter Short to lead us into this.

MR. BALDWIN: Thanks very much. It's a real pleasure to be able to be here today.

And I want to start out -- first, Walter

happened to be in town for another conference, and so I asked him to join me today to present this. He is the group manager out at the National Renewable Energy Lab of the team that has been responsible for -- and he has been the leader for building one of the key models that we're going to touch on. And so I've asked him to -- particularly with that expertise, to really be able to go through some of those details.

I also want to thank the Office of Electricity, especially David Meyer, who's been collaborating with us on this study, has joined and guided us in how we've proceeded. And David asked me to give a preliminary look at what we were doing.

Slide 2, please.

And in particular, let me emphasize that the current status of this is it is in external peer review, so we cannot show you any of the observations, conclusions of the modeling. We can give you an idea of what kinds of work is

underway, what the models are doing, how we're approaching it, but we cannot give any conclusions.

And at the end I'll key this up, I'd like to invite any of you with your incredible level of expertise and experience in this field to also volunteer, if you'd like, to serve as part of the peer review process that we're undergoing right now.

We had originally set a date of November 8th, but I'd be happy to extend that if we could tap into your expertise.

So the key things we're going to touch on today is a little bit of the background and motivation for this study, the modeling approach, and then some of the key questions.

Next slide.

So, the context you're all well aware of all the environmental issues, all of the energy price volatility issues. It even goes to dependence on imported oil because down the road

we're going to be looking at things like plug-in hybrids. And that has -- that is going to have an impact on the grid and how we think about how the grid operates.

And the responses -- more efficient use of energy -- that's got to be first and foremost -- that is the low-hanging fruit in many cases; and we can do a lot through efficient use of energy.

Down the road, as we think about it, there's also going to be a shift from distributed fossil fuels to low-carbon electricity sources. Why do I say that?

If you look at the likelihood the cost, the impact of trying to sequester carbon from all the myriad distributed uses of fossil fuels, that's very difficult. And so we are likely to be thinking about things even such as air source or ground source heat pumps, runoff low-carbon electricity as a way to provide heating services.

And it's not just climate change. Let me

emphasize that. Carbon dioxide going into the atmosphere is also acidifying the oceans. And the data is clear that the oceans are becoming more acidic, that that upsets the carbonate balance. And it's not just coral, it's also things like phytoplankton and zooplankton that are at risk. And so that is an issue that has to be addressed.

So in terms of low-carbon electricity generation -- next slide, please -- there's three broad sets of options: renewables, nuclear, and fossil with carbon capture and sequestration. And my expectation is that all of these pathways will have important roles down the road.

And I just also emphasize that renewables is lumped there as one, but it's actually a whole range of pathways. It's wind; it's solar; it's geothermal; it's hydro; it's biomass. And that altogether gives you a much stronger, more robust portfolio than any individual technology by itself.

Now, across all three of these areas -- renewables, nuclear, and fossil CCS -- they face somewhat related challenges of meeting public concerns of safety and environmental protection. Renewables do as well.

There are challenges to siting new facilities in publicly acceptable areas with adequate power transmission. How do we reduce the capital and operating costs of these systems and also manage the generation characteristics? That ranges from nuclear which tends to prefer base load to renewables which can be highly variable.

And so what this study is a first cut at looking at, you know, how far can we push renewables. What is the generation adequacy? What are the impacts? What are the costs, performance at high levels of renewable energy generated electricity?

So the opportunity -- renewables are abundant, diverse, distributed. And what we're

doing in this study is developing a detailed bottom-up evaluation of what can be achieved at what cost. What constraints need to be addressed? What research needs to be done? What policy pathways are needed to approach it?

This first part of the study we do not look at any aspect of policy. We don't look at carbon policy. We don't look at any change in policy for renewables. We assume that the policies currently in place to support renewables expire at the end of their current statutory life so that it ends up being a policy-neutral and incentive-neutral analysis.

Out of this we also have to start thinking much more about how you make a flexible grid both in supply and demand.

I mentioned plug-in hybrids. Well, as you bring plug-in hybrids in, you can charge them at night, or you can charge them at other times when sources are available -- supplies are available.

And when you start thinking about large penetrations of renewable, to this point most of the focus has been on, say, just wind. And so you get all the variation with just wind.

But if you start thinking about wind blows more at night, early morning, late evening, and the sun is during the day, so you start finding potential synergies across different resources at different times in different areas. And there is a strong regional impact as you all know.

As the Honorable Smitherman mentioned earlier, wind in Texas. You've got sun in the southwest. You've got offshore Atlantic winds. You've got biomass in the southeast. So, there's strong regional variation in renewables as well.

The challenge of renewable is that they are very site specific. Their resource intensity is quite low. These are very low energy flows. And that means you need a very large area to collect the renewable resource. That leads to a

high capital cost.

Some of them like wind and solar are variable, and that leads to issues of to what extent do you need storage or not.

On the other hand, you don't have -- in many cases -- in most cases -- fuel costs associated with them. So you avoid fuel cost volatility. And in effect what's happening is with renewables you're buying a large capital expenditure, but you're essentially paying up front for the fuel cost over the entire lifetime of the system by having that large collection area.

So the goals of this study have been to explore large-scale renewable technology deployment in the continental U.S. and understand the implications in terms of what the resources are -- geographic distribution -- the research requirements.

And one of the things we've done that Walter will talk about in a minute is we've gone

from seasonal to hourly generation adequacy. So we've looked at -- with grid view - 8,760 hours per year of what resources come in at what places. How well do they serve the demand?

And this leads immediately to questions like what are the electric system operation and expansion challenges. What are the sensitivities? And we've done sensitivity cases on transmission, on grid flexibility, on resources, and others.

And let me emphasize what this study is not. It is not a detailed transmission and integration study. Those typically look at very high resolution time series -- look at frequency response, look at stability. We have not done detailed transmission and integration studies at the sub-hourly level. We have gotten to the hourly level with this, which I think is a significant step forward, but we've not gone below that.

It's not an integrated model of carbon

mitigation pathways. We have not looked at the carbon issue. This is just renewables; how far can we push them; where does the system start running into trouble; what kinds of implications does that have.

It's not a renewable energy vision, which tends to be very conceptual, high level. As I said, we get down to the hourly level, looking at a whole mix of generators across the entire continental United States.

And so, there will be -- and there is a need for much further study of this. This is just a first nibble at this larger problem. And that includes the sub-hourly issues, the optimization analysis, the economic and policy analysis, and so forth.

So, some of the general assumptions: It's based on renewable energy technologies that are available today with expected evolutionary development. We do not assume any technology breakthroughs, but we have done two things.

We've had a team of Black and Veatch has done a -- an analysis across all the technologies where they assumed very little -- in almost every case except for solar -- very little improvement in the technology just with where they saw things going without any further learning.

And then we've separately had teams of people across each of the renewable technologies do very careful bottom-up engineering analyses, evolutionary improvements where can the technology get to.

We also assume aggressive energy efficiency measures. And we also have a case -- as shown in that chart there -- where we continue current demand growth. And so we look at both cases.

With the aggressive energy efficiency measures we also add in things like plug-in hybrids and look at what the implications are from that.

MR. COWART: I think we're going to run

out of time.

MR. BALDWIN: So let me leap ahead very quickly. You can read through the rest of these items, and briefly, the overall organization of this study has been led by a combination of NREL and MIT. We've had over a hundred and forty people contributing to it from some 50 organizations broken out in the groups that you see there.

And in terms of the scenarios, you can simply read through. I have -- because this is under review right now, I've carefully scrubbed out all of the data that might actually seep through. And so I simply give some general words. So, all of the interesting stuff I've carefully avoided -- so, an additional incentive for you to become a reviewer, and then you can look at all the details.

And so let me turn it over to Walter here to talk about some of the detailed modeling.

MR. SHORT: So, about eight years ago we

were being asked constantly, well, how much can we do with renewable. Which ones should we focus on?

And we started looking around at the models that existed at that time to look at things in the long term, to look at things at the national level, to really look at the items that were of most importance to the leading renewable that we saw coming down the road, being primarily wind and solar. And of course, they brought with them their variability, and in the case of wind, their remoteness.

And so, as we looked at the models that existed, we really couldn't find what we needed to do a long-term -- to get detailed look at the -- at the picture.

And so we started building what has become this Renewable Energy Development (**RED**) **Model** which you see on the chart here. And it does for us a number of things -- and I'll take a few minutes to explain the next slide, but basically, it

builds out capacity of both generation and transmission.

And we realized at the time, though, that it just does the wholesale electric markets. And so we needed to be able to also look at a distributed market. So, that's where this other model, the Solar Distributed Systems model came in which does PV on rooftops. And because that's a whole different market in terms of residential and commercial building owners and like, we felt like we had to take a different approach; and you'll see more why when I explain the REDS model, which is more oriented towards large decision makers.

On top of that we found that we really couldn't address all the questions at this -- at this national long-term capacity expansion model. We needed to go down and check the results at an hourly level.

And so in the last six months we've added this GridView model which Sam referred to to

allow us to look at actual unit commitment, day ahead unit commitment with hourly production, hourly loads, real time -- or hour ahead markets as well as day ahead with an optimal power flow so we get at the transmission congestion problem in a much more detail that we can do it at the national level.

So, quickly, I'm going to try to explain those. I think we have about five minutes left, Richard or --

MR. COWART: Five.

MR. SHORT: Five, okay.

Okay, so I won't take much time here except to point out a couple of key things. The model that we run now does do the whole - this REDS model -- Regional Energy Deployment System -- does do the whole country. And the reason for that is we wanted to be able to transfer power across the interconnection.

Well, whoa, there's a problem there. Automatically you've got the AC/DC/AC interties.

We tried to model those and the costs associated with that. We're trying to look at it from a whole system perspective.

So we get down into the issues of variability of the wind and solar in the form of looking at curtailments of those technologies as you get to very high levels. That takes some statistical work, which we do.

We basically run the model two years at a time and march through time. And in between these optimizations we come out and do statistical analysis. Okay, where do we stand? How much curtailment did we have with what we've already got in? If we put in new wind plants, how much more curtailment do we have? What's the capacity value of those in terms of how much can count towards a reserve margin constraint that we have in the model. What's the operating reserve requirements? They will induce additional operating reserves in the form of back-up, quick start, spinning reserves, and that type of thing

based upon forecast errors and just their natural variability.

We look at their regulation reserves. So we're doing all these things in this model and moving out all the way out to 2050.

Well, in addition, we also want to look at the transmission expansion required. Now that gets very difficult because obviously you can't represent the whole transmission system and do it on a -- certainly not an hour -- not even an hour basis. We basically run it at a level of 17 time slices in each year. That's pretty coarse, and that's why we do the GridView check at the end.

It's also why we do the statistical calculations that we go through to make sure we understand really what the value is of these variable generators; but we don't just have the variable generators. We've got biomass. We've got a geothermal in there. We've got hydro power, and we have the conventional technologies represented as well.

And basically, the model marches through time, expanding the capacity of the generators and, as I said, the transmission.

Now, frankly, the transmission generation that is going to be in this study from this model is done on a -- like a pipeline flow. So we're not doing optimum power flow at this national long-term modeling.

Then we go over and we check what it comes up with in GridView to see how well it does.

So, let me go -- jump to GridView.

I'll just add one more thing: It is an electric sector only. So it's not a general equilibrium model. It's not doing the whole economy. It's not doing the end-use demands that we have to feed it end-use demands for power by region over time.

The model actually has 358 supply regions. You can see the little teeny regions down here. That gives us the -- the ability to

really look at the transmission requirements. Where is the wind or the solar, and where are the loads? It gives us the ability to also look at diversity, which is one of our options for addressing some of the variability o the wind, to spread the wind resources out. The model will consider that.

It will also consider load options in terms of interruptible loads. That's folded in in terms based upon some of the FERC studies that just recently took place.

It considers storage as an option. It considers quick, rapid start generators as an option to help mitigate some of the impacts of variability from wind and solar, for example.

But moving on, to the GridView model, what we do is we run this REDS model. We run it out to 2050. At that point it's got a whole different system, especially if we're forcing a certain level of renewable in, which is what this study's about. We tell it, you will build a --

this much -- you will have this much generation from renewable.

Now, it chooses what type of renewable, and it chooses what gets displaced; but we force it to do it. And then we have a different mix at that point, and it has a different transmission system, too, because it builds transmission out.

We take that capacity of both generation and transmission and feed that into this GridView model and run it on an hourly basis, essentially, out through the whole 8,760 hours of a year. And it incorporates a lot more than we can get into that -- the first model in terms of the ramping capability of conventional generators, the minimum run times, the cost associated with ramping them, the minimum down times, the -- the minimum level of operation of some of your large nuclear and coal plants and that type of thing. So it gets to much more detail level.

So, that's where we're at. As Sam said, we'd like to go down to, you know, five-minute

levels; and we're looking at that for future activities. We're going to be, hopefully, looking at some AC power flows and not just the DC optimal power flow that this does, but the linearized optimal power flow that is in this model.

So, this -- we haven't answered all the questions; but what we're finding so far is there are issues, but by and large, so far we found that we can handle them.

So, moving forward, this is the first time a model like GridView has been run at a national level. We worked with ABB, the commercial producers of the GridView model and to modify it to allow us to do connections between the interconnects.

I'm not going to spend a lot of time here except just point out that we get a wide variety of patterns coming out of GridView as you might expect, especially at very high penetrations of renewable.

In fact, if you look right here, you can see in the springtime if the sun's shining in the daytime and the wind's blowing, we get days like these where you've got a lot of power -- the black line being the load, the gray being power that you simply cannot use. So you get a lot of curtailments occurring in GridView. Some of it occurs just because of the level of generation. A lot of curtailments occur because there is congestion in the transmission system that GridView will identify.

And so, we look at that, and yet the system -- we've run the GridView's results so far. We basically see that, yeah, what REDS comes up with, we can use that configuration and still meet the loads; but it also points out that we have these curtailment issues. It points out that we have some congestion that, you know, isn't necessarily identifiable in the REDS model. And I guess that's the biggest two findings.

So, at this point what we're doing is

changing the REDS model so that it does optimal power flow as well, which is a tricky thing because you have to reduce the network considerably in order to do that – to get (inaudible) into this big model. So we're in the process of doing that, and we have some nice early findings on that; but they probably will not be a part of the studies that comes out.

Actually, this is a comparison -- on the left -- of the -- maybe I should skip this because I know I'm running out of time.

MR. COWART: You should get to your last conclusions.

MR. SHORT: All right. Let me do that.

So, this is just the form of the results that it will take. We'll be showing storage. We'll be showing actual expansion over time. We'll be showing different cases, different sensitivities.

And I think -- yeah, and we'll also be looking at things other than just energy. We'll

be looking at water, health effects, et cetera, that are really kind of a post processor to these modeling activities.

And now back to Sam.

MR. BALDWIN: Yeah, and so these are -- these are the questions that we're trying to grapple with. What kind of capacity generation over time is possible? What are the implications, sensitivities? What are the curtailments that Walter mentioned? System costs? How much unserved load there might be under different conditions? What are the regional variations?

I guess what I'd like to do is pose it to the panel -- to the Committee as to what are the key questions you think we ought to be grappling with. And finally, if any of you would like to be reviewers over the next two weeks.

And in closing, I'd just like to ask if you could show the video for a second? And what this video is going to show is a particular

month's -- hopefully, it will run -- where we have a visualization of the GridView results. It's marching through very rapidly on the hourly level, showing the different resources coming in in different parts of the U.S. So, as you can see the sun rises from the east, and you can see the solar coming in and moving to the west.

You can see at different times wind coming on. This is based on 2006 meteorological year data. And so, it shows how all these different parts are coming in but then also identifies where you can have some potential synergies between -- you know, with the wind coming in at night, as I said, and the sun during the day -- you know, backed up with hydro, with biomass, with geothermal. So, there's a whole mix of different things. It makes it a challenge at one level; but the system today also faces many challenges in terms of being able to operate the system in a reliable way. And that, of course, is the ultimate bottom line is can this

be done in a way that really meets -- the demand really serves the public and is reliable.

Thanks very much.

MR. COWART: All right. Well, I'm —- I imagine that there's a few people who might like to get an early look at this and might volunteer to be reviewers in order to do that.

And in order to keep us even remotely on schedule, we're going to have to just take a couple of quick comments and then move directly to our next presentation.

So, I noticed – oh, it's going to be hard, huh? Can you keep your comments really brief?

We'll -- we will be able to return to our view of this issue this afternoon.

Mike?

MR. WEEDALL: So, I just want to add one item to the last bullet point you had on your slide, David, which is other key questions.

So, we've got 3,000 -- over 3,000

megawatts of wind on our system right now and other renewable. We're on our way to 6,000.

The policy issues associated with how to integrate that into the system just really needs some attention. We're actually at a point, as I think many people around the table understand, that we have -- we have negative pricing at times in the northwest, you know.

You know, if you think about -- you know, a strategic well-integrated system that is just not a good place to be. You know, I Mr. Energy Efficiency, and when I'm having to deal with negative prices, it's, you know, just a whole new dynamic that I never thought I was going to face in my life.

So, certainly, you know, I'm sure some people from our organization must be involved in your study; but if not, please, please, please get us involved. Thank you.

MR. COWART: I'm not sure. I'm just going to take the cards that are up and just ask

you to make your comments really brief.

Ralph? I'm going to come around the table.

MR. MASIELLO: Okay. Speaking as a reviewer, let me warn folks it's about six inches thick. And it's important, I think, to take the attitude with -- it's not how well this bear dances but just that it dances at all because it's such an ambitious undertaking to build a model like this.

I have a philosophical question. This would be the first such report of its kind -- the first results of this kind, and in order to really reach consensus around its results going forward, it seems to me it would be important if this took on a little bit of the nature of an open source project where other groups that weren't participants could have access to the models and the databases, do things like substitute another tool for PLEXOS or whatever because you get more valid -- the more -- the

more interaction there is like that and use of it, the more validation you get.

And I wonder what the Department's philosophy around that is because if the databases and results are kept as a kind of closed intellectual property, then it's just one more thing for people to throw rocks at.

MR. BALDWIN: Yeah, I know. I think that's an important point. And, Walter, you have a lot of this stuff up. You've published a technical report on -- on REDS.

GridView, of course, is privately owned -- that we don't have access to.

But I think that's an important point. We'll follow-up on that.

MR. SHORT: Right. We have access, and I think the database coming out of this could be made available to people to run it on their own production cost models, for example, like PLEXOS is a great -- we're looking at PLEXOS with our sales right now.

MR. COWART: Just coming around. Did you have a comment, Ed?

MR. KRAPELS: I just had a quick little question. The on-shore, off-shore wind resource assumptions -- are they clearly delineated in the study?

MR. SHORT: The report hasn't come out yet. I mean, it's being reviewed now, but yes, they are clearly delineated there. And there is a definite divergence between the two, obviously, in terms of resource and cost and capacity factors.

MR. COWART: Fred?

MR. BUTLER: Yeah, just an observation and maybe a question about the assumptions underlying this.

I want to go back to that concept of regional differences. I try never to disagree with my friend and former colleague, Chairman Smitherman, but the sun is not only shining in the southwest. The Number 2 state in this

country in terms of solar deployments happens to be my own state of New Jersey.

States like Illinois, New York, Ohio have solar carve-outs in their renewable portfolios. We've got 40 megawatts of solar that's going up on utility poles, micro deployments of solar on utility poles in New Jersey. And we're north of 150 megawatts already in solar.

If we're thinking of solar as only being in some portion of --

(Inaudible.)

MR. BUTLER: Okay. Thank you for that because I heard that twice now and once from --

MR. SHORT: In fact, I don't know if you noticed on the map, but the -- I was actually surprised. Much of those solar things are in the east.

MR. BUTLER: Thank you.

I did, too, but then I heard, you know, solar in the southwest, but -- okay.

So the study is going to recognize that

and is going to encourage some of the other states to -- to take that route?

MR. SHORT: The study's not actually going to encourage anyone in -— it's simply based on economic findings, what makes the most sense given that you've got to do a high level of renewable.

MR. COWART: Barry?

MR. SMITHERMAN: Your study assumes unit commitment of economic dispatch model, but many parts of the country are not in an ISO.

And, in fact, I was going to bring this up with Gina when she was here because you can make an argument that one of the most important things we should do is put all parts of the country in an ISO so that we can have this kind of dispatch model.

I mean, Electricity Reliability Council of Texas (ERCOT) has some -- 2013 -- 2013 models which show coal being turned down dramatically in the spring when we get -- Mike, you've got three;

we've got nine. We're going to 18 gigawatts of wind. There's your carbon problem resolved right there.

So, how do we match up your assumptions about the model with the fact that many parts of our country are not in an ISO and don't seem to have plans to get there?

MR. SHORT: You want to try it, Sam, or -- you know, I think the unit commitment day ahead, and an hour ahead actually imposes some tougher conditions on the system in the competitive market than we might see in a regulated marketplace.

And so, I think, if anything, our results might facilitate some of the -- some of the penetration of these variable renewables.

MR. COWART: Obviously a topic for further discussion.

And let me do the necessary here, which is really to move us along because David Nevius has an additional presentation for this part of

our agenda, and I want to make sure he has time.

Thank you so much, guys.

And I will say whether we read the six inches or not, we look forward to reviewing with you the final results.

MR. NEVIUS: Thank you, Mr. Chairman. We had a report that came out last April. It's only about a quarter of an inch thick, so I encourage you to read it. I think Peggy has provided you a link to the report. If not, we can.

It's called *Accommodating High Levels of Variable Generation*.

What I want to do today is just say a few words. I'll kind of skip through most of this because you all know who NERC is -- hopefully, you do.

What this Task Force was that we formed to look at the impacts of high levels of variable generation on the system and some of our recommendations and, more importantly, what we're doing from this point going forward in terms of

next steps.

We are an international regulatory authority for reliability in North America -- not just the U.S. We are overseen in the U.S. by the Federal Energy Regulatory Commission.

We set and enforce compliance with reliability standards for the bulk power system. And we assess current and future reliability. And it's under that last rubric that we have done this assessment of the impacts of accommodating high levels of variable generation.

We formed a group under our planning and operating committees. These committees comprise technical experts from the utility industry from all sectors -- independent power producers and so on.

Back in December of 2007 there were almost 50 participants, including Michael Milligan from NREL, who was a participant in this -- utilities, Independent System Operators (ISOs), Regional Transmission Organization

(RTOs), and wind and solar manufacturers, and so on. We had some strong cross-border collaboration. In fact, the chairman of the group was from the Alberta Electric System operator. The focus was strictly on reliability.

So, what are we talking about when we -- when we say variable resources?

I shifted these slides a little bit, and I guess this one didn't get shifted; but let me just go to this one, and I'll double back.

They're resources that rely on an uncontrolled or variable fuel to generate electricity. They require significant changes to the traditional methods used for system planning and operations, and they have the potentially to fundamentally change how the system is planned and operated and used -- from the grid operator to the average customer

We expect significant growth in variable generation. There -- the new policies and environmental priorities are driving this growth.

We've all seen that.

There's over 200,000 megawatts of nameplate wind capacity proposed in the coming 10 years. And you'll see across the bottom here the -- where we are now and where we expect to be in terms of planned and proposed wind capacity. And I'll emphasize this is nameplate capacity in the different regions that comprise NERC.

Here's a -- I think Walter and Sam have already talked about this, you know, and I appreciate the fact that they've gone to an hourly model for this REDS model because you can -- and you even have to go sub hourly to fully appreciate the impacts.

Here's a typical daily electricity demand curve. We fill in the base load with nuclear, coal, and some hydro -- intermediate load, some combined cycles, peaking with combustion turbines and so on, and then the necessary operating reserves that are necessary to keep the system continuously in balance and provide constant 60-

cycle power.

So the capacity here is an instantaneous measure of what we have available to serve the demand at the time of peak.

Now, I think Sam and/or Walter mentioned there are some complementary renewable resources. The bottom curve is solar on a typical day. You'll see it peaks in the middle of the day, and that's just about the time that the wind stops blowing as hard, so there is an opportunity there. So, it doesn't -- but overall, wind generation doesn't necessarily correlate positively with your typical electricity demands, especially in the summer periods.

We've got some charts in here that you can look at. The important thing is somewhere between 8 and 26 percent, depending on where you are in North America, of that nameplate capacity is available at the time of peak demand.

I have another slide that'll emphasize that as well. I already mentioned about wind and

solar can complement each other.

One thing that -- that wasn't mentioned but's very critical is the fast ramp rates that wind can ramp up and ramp down very fast.

Commissioner Smitherman certainly knows this. I know ERCOT has some issues with this early on, and they've improved their operation.

Wind can ramp up and ramp down very, very quickly; and you have to be prepared for those ramps in order to have other generation available to move up and down to accommodate for that.

Here is the projected -- planned and projected nameplate wind capacity that's expected to be out over the next 10 years. And here's what it is in terms of available at the time of peak. So, you can see that this is the 8 to 26 percent I referred to.

It's also some geographic diversity. Generally, you have a lot of wind where there isn't a lot of load and vice versa. So, transmission becomes a key issue, which has

already been mentioned; so I won't belabor that.

So what do we have to do to keep reliability in balance? Well, we have to maintain this balance between supply and demand all the time, regardless of the generation mix that we have.

The generation has to be such that it complies with the rules of the system. Low voltage ride-through issues are key when it comes to -- especially to wind generation. And the industry standards and the criteria that are applied have to be fair, transparent, and performance based so we don't prejudice one form of generation over another.

These high levels of variable generation are going to require significant transmission additions. That goes without saying.

There are barriers to transmission development that we addressed in the previous Electricity Advisory Committee -- cost allocation being one of the key issues there.

Additional flexible resources such as demand response, plug-in hybrid vehicles, and energy storage can actually complement the variability of wind. And I think that's -- that's something that this group could certainly look at.

We also need improved measurement forecasting and modeling, and I applaud the work that is going on at NREL in that regard.

Some areas of further study that we've identified for both ourselves and for the industry at large: more comprehensive planning approaches and operational practices, including some probabilistic approaches. In the aggregate, variable generation connected at the distribution level has to be evaluated as well because that can have an impact on the bulk power system.

Mentioned the complementary types of variable generation and leveraging some of this fuel diversity over larger geographic areas is also important and greater access to larger pools

of generation and demand can help accommodate some of these effects.

This -- I won't belabor this chart, but here are some of the actions that have already been completed as a result of our study. There are several others that are under review and then some more that are still under development and stretch out for several more years into the future.

I look forward to the opportunity for our folks who have worked actively on this -- this particular activity to work closely with the work that is being sponsored by NREL and the Department so that we can collaborate. I think we can combine forces and help each other quite a bit.

So, hopefully, I've saved a little bit of time here to take away, certainly, a lot of government policy drivers and societal benefits of renewable energy. We -- reliably integrating these resources into the power system is going to

require some significant change to our traditional methods of how we go about planning and operating this -- this most complex machine ever de3signed by man as it's called.

` And while this variable generation differs from the traditional generation, properly integrated it can and -- can help reliability, and it does not necessarily need to hurt reliability.

So, with that, I'll stop and hopefully I've saved you a little bit of time.

MR. COWART: You get the prize.

We have time for a few quick comments. I see the -- Rob's quick here on his card.

MR. GRAMLICH: I've been waiting all morning for this.

Thank you, but the DOE, and NERC, and NREL have all done excellent studies on integrating renewable. The problem is we haven't heard about any of them.

Yet this morning these long-term,

futuristic studies are nice; but I believe the IVGTF Study and NREL's various studies, including the eastern and western renewable integration studies and the DOE 20 percent wind by 2030 report have all -- in the spirit of Commissioner Azar's low-hanging fruit or pencils instead of million dollar pens have identified some low cost and relatively easy solutions that are available to integrate a lot more renewables than we have today.

And so the question for the presenters is do you agree with my characterization -- since I'm going to have to conjure these up from memory -- that things like fast dispatch, things like five-minute as opposed to the hourly scheduling and dispatch that is in practice in much of the country, regional pooling. Chairman Smitherman mentioned RTOs and ISO -- and ISOs. That's one way to get the regional pooling but not the only way.

Better forecasting and integration of

that forecasting into balancing operator operations, balancing area coordination. It would be great to have consolidation as a number of regions have done in the successful renewable energy regions like California, New York, Texas have done that; but you could do it through coordination as well. And, of course, transmission infrastructure would all allow for much higher renewable energy integration than we have today while maintaining reliability.

And since all of these features are in deployment in many parts of this country and the rest of the world, they don't require a whole lot of new research or development. They're there and ready to be applied as soon as we're ready to put them in place.

The last was an editorial comment, but do you agree with my question that your studies have identified those features?

MR. SHORT: I certainly agree with that. We were asked to talk about this new study. We

do have these existing studies. They did show quite a bit. You know, that list is a great list. I guess I would add demand response and storage and -- well, you -- yeah, basically that's a great list. And it comes from that work and the work of others. I think it's well supported.

MR. BALDWIN: And I would only add that this is a great list of issues that I think may be something that the Committee wants to -- or some portions of which this Committee may want to grapple with.

You know, they're not easy issues like, you know, growing balancing areas. So that raises a number of factors.

MR. COWART: Mike.

MR. HEYECK: I agree with Rob. Let me say that -- let me say that the -- EPRI has sponsored a trip in June to Spain. And we visited with Red Electrica. Others have actually begun to solve the problem, and ERCOT is not far

behind with the penetration that they have. In fact, the peninsula -- the Iberian Peninsula is about the size of ERCOT.

But they come up with three hurdles. One is interconnects and standards -- making sure the low voltage ride-through, for example, because they could lose a quarter of their wind with a fault in a particular region.

The second is interconnection. They suffer for lack of. There's very little interconnection with France.

And the third is being -- having the visibility and being able to dispatch. They do have a -- one view of things with a control center in Madrid that's very, very good and very technologically advanced.

So, we have others out there that are actually doing it. And the fact of the matter is these are technically solvable problems. It's not really a problem.

Having said all that, we all -- we all

know about the political side of this with respect to impediments to transmission, and cost allocation, and planning, and so on which I'll not belabor.

My point is this is technologically solvable, and others are solving it, including ERCOT.

MR. SMITHERMAN: Rob, that's a great list. I would add one thing to it, and that's the appropriate role of demand response and how that will be characterized by NERC, for example. You know, we have 11,050 megawatts of load acting as resource. I'd like to see that number go up.

How do you pay them? How do we -- how do we get treated by NERC and others if we actually access LAR; but that's in a key role in making this all work.

MR. COWART: All right. Thank you very much. It's -- I'm sorry.

MR. NEVIUS: Hi, I don't know that I have anything else to add. I think folks have raised

this before.

I know the last time the Electricity Advisory Committee got together on this we did talk about the complementary nature of wind and storage. And if you can find the right locations and technology to do that, they form a very, very good complement to each other.

That's not always been something that's been supported by the wind development community, but I think it's something that should be discussed a bit more.

MR. COWART: Brad says it's changing.

This is a good - exactly the perfect transition point to our next topic which is energy efficiency and demand response. Storage and demand response obviously are complements to variable renewable resources.

And we've got two speakers to talk about this topic as well. So why don't we just turn to that.

I see Steven's slides are up first, but I

thought -- do you have an agreement on who's going first?

FEMALE SPEAKER: Yeah, David Kathan is going to go first.

MR. COWART: Okay.

FEMALE SPEAKER: I'm sorry. You're going first.

(Inaudible.)

MR. NADEL: Okay. Good morning everyone. We still have a few more minutes in the morning.

I'm Steve Nadel. I'm the Executive Director of the American Council for an Energy-Efficient Economy (ACEEE) -- happy to be here, recognize quite a few of you -- both -- various ways, including -- I used to be on this Advisory Board -- so with some of you.

I think many of you – actually, I was asked to speak about energy efficiency as a power resource. Dave has graciously agreed to swap because I have to be downtown -- back at 1:00. I'm going to talk about energy efficiency; he's

going to talk about demand response. There are two sides of the coin, and together they make a very significant demand side resource.

Now I'm with AC triple E. I think many of you know us. We've been around for 30 years -- in fact, celebrating our 30th anniversary this year. More than 35 staff focus on many different end-use areas. We've worked on utility sector energy efficiency programs and policies since the 1980's.

I believe my slides are going to be distributed to this Committee after these meetings, so I won't spend lots of time on all the details. Those who want to go into a little bit more detail, there's lots of information here.

Now, this is too small to read, but this is from the January 2009 Electricity Advisory Committee report on the role of energy efficiency, looking at about two dozen studies on the technical, economic, and achievable potential

for energy efficiency, finding that in terms of economic potential the median or average was over 20 percent savings available. The achievable was -- I think it was 16, the median and average.

If you look at it per year, because these studies vary in time frames, generally you're talking about one and a half percent per year and up looking at the range of studies.

Likewise, this tends to be a low-cost resource. This is from a study we did last year at AC triple E. These are the average levelized utility costs for energy efficiency programs in, I think it's, 14 different states. The states vary somewhat from 1.6 cents to a high of 3.3 cents. The median was about an average utility cost of about two and a half cents a kilowatt hour.

Now, maybe there is some old fully depreciated coal plants that have a marginal cost of two and a half cents, but most resources have a marginal cost quite a bit higher than that.

This puts that two and a half cents per kilowatt hour in perspective. This is the Lazard study done for NARUC. I don't mean to dwell on the exact numbers. There are lots of other studies -- EIA and other people have done it. The point here is that energy efficiency is half to a third of the cost of typical new-generating resources. And I think most of you know that.

In terms of the role of energy efficiency, I think a good illustration is the Sixth Northwest Power Plan. As I think most of you know, the Northwest has been doing power planning since 1980 for the whole region. The sixth plan was just finalized this year, and this is a curve -- this is kind of a summary of the incredible amounts of analysis they did. It's a curve showing how much capacity at what cost is available.

As you go along the bottom axis, you get more and more capacity. As you go up the y axis, you get higher cost. Green is energy efficiency.

You can see most of the low-cost resources are energy efficiency. Once you get to -- around, I think, close to a hundred dollars an average megawatt, you pick up a little bit of gas, continue to pick up a lot of efficiency renewable basically efficiency tends to dominate.

As a result, the Northwest has decided to increase efficiency spending by two to three times over the next five years; and they're expecting to get about -- I think the final plan was about 85 to 90 percent of low growth.

Mike, do you recall the exact figure?

(Inaudible.)

MR. NADEL: Okay. A little bit of gas, some renewables. They do a fair amount of -- you know, it's kind of site banking in case demand proves to be higher than expected for some of the longer-term resources; but most of their demand can be met with energy efficiency. And this is in a region that's been doing a lot of efficiency for 30 years, basically.

Many of you are probably familiar with the McKinsey analysis on energy efficiency potential. They found overall about a 23 percent efficiency potential across all sectors, varying a little bit from sector to sector but significant in all of the sectors, also significant in all of the regions; but you can see reductions range from 22 to 24 percent of energy used by region -- not very much difference.

Some of you are probably familiar with the Electric Power Research Institute (EPRI) study where they came up with lower savings estimates than most of the other studies. This is from McKinsey, and people could look at it kind of explaining all the differences between what EPRI estimated and what they estimated in terms of various things that they looked at that -- the EPRI study was more limited.

Now I know EPRI is starting to work on a new study. Some of us have a meeting with them

next week. We're working with them and we hope that the next study will be more robust.

And all of this doesn't take account of many new technologies that are recently being introduced -- you know, with our heat pump, water heaters, LED lighting, various types of feedback that you can provide through Smart Meters or the one on the right there -- some Google, et cetera.

Just to mention feedback as an example -- this is from a study AC triple E came out with early this year looking at providing feedback to consumers in ways that consumers can understand and is actionable. We found average savings of about 4 to 12 percent, depending on how much feedback you provide, how useful it is. There is enormous variation there.

The enhanced billing -- things like OPOWER is doing with quite a few utilities -- that's just the monthly reports.

Real time plus means providing feedback in real time on a product specific basis. So a

few of the Smart Meter pilots are getting into some of this. Many of them are not, but there is a real, I think, opportunity to use these Smart Meters in ways that provide that information that consumers can use but do it in ways that consumers can understand and act on.

Just the one transition I have for -- between our work on feedback and demand response in the next talk -- many of these feedback programs also use the feedback Smart Meters to help promote demand response. And a lot of the savings depend on, really, what you target. If you really are targeting peak demand, we looked at the various studies, and we looked at about 60 studies.

We were getting peak savings on the order of about 12 and a half percent -- very significant where they target peak demand. They were getting very -- those programs that target peak demand were getting small energy savings -- average energy savings of about 3 percent. On

the other hand, those studies that really targeted efficiency, they were averaging more like 10 percent energy savings. We did not have good data on the peak demand. A lot of the efficiency studies didn't log that data, so we couldn't report it.

As you probably know, energy-efficiency budgets as a result of these opportunities are going up substantially. This is from the Consortium for Energy Efficiency. They estimate a total spending for a U.S. gas and electric programs at about $5.3 billion last year. I think this year's total will probably be above 6 billion.

And likewise -- oops -- this is a study recently released by Lawrence Berkeley National Lab looking at future energy efficiency spending and estimating under various scenarios that by 2020 it could be anywhere from about 5 billion under a low scenario to more than 12 billion under a large scenario -- so, likely going up.

Now, there are a variety of policy approaches for helping to promote energy efficiency. I think most of you know many of them. You can do integrated resources planning, include energy efficiency in rates. A number of states have also required as part of this utilities -- acquire all cost effective efficiency. It's been a particularly popular approach in the northeast, for example.

You can do a systems-benefit charge, a charge you pay for these programs. It was very popular in the 1990's. I'd say of late people are not doing as much of that. People -- the recent trend has been toward energy efficiency resource standards, energy savings targets.

I think legislators in particular prefer to set targets rather than spending amounts. The idea with the targets is you try to find the least cost way to do those as opposed to setting spending amounts you're not sure how much energy you will save.

There's also some wholesale level approaches, which I will just get at extremely briefly and -- but that may be a productive avenue for this Committee. And then codes and standards is a useful complement. So let me go into these a little bit.

An example of savings targets has been Vermont. I think they've been the most successful. This is data through 2008. I haven't been able to get the 2009 data. I think they're still finalizing that.

But they've had 9 percent cumulative savings since the programs began in 2000. When I say cumulative, I mean savings in 2008 as a result of measures installed over that 9-year period. In 2008 they actually saved two and a half percent of energies -- electricity use from programs implemented just that year.

Now, that was the last year of a target, so they really let out all the stops. I believe in 2009 the preliminary figures are more like

1.75 or something like that but still very substantial.

Oops. This is from efficiency Vermont. In order to do that you really need programs that get at all major market segments -- existing homes, existing buildings, businesses, new construction, low income. And then what's very important, I think, is to key in on important submarkets, you know, in the northwest, you know, they used to have aluminum smelters were the special focus. Paper has been a special focus at times.

In Vermont, you know, they have a lot of colleges. They have granite. They have a special program focused on granite and stone cutting. They have a special program focused on ski areas, you know, really trying to look at what are the major end uses and how do you go after them.

Massachusetts is another example. They've been kind of cruising along at -- oh,

about 0.8 percent savings each year, but they, as part of new legislation and a new plan, have decided to about triple their programs -- get up to 2.4 percent savings by 2012.

What that does in Massachusetts is that pretty much gets you in between the purple line and the green line on this that they're going to be sending load negative.

Vermont has actually been doing the same. They have underlying low growth of about one and a half percent a year; so whenever they exceed one and a half percent, they send low-growth negative.

That does not mean that you never need a new power plant. We understand that even if you can turn load negative, old power plants will get retired, you know, in response to they're again, they're inefficient, environmental regulations, et cetera, but it does make it a lot easier if you're replacing existing plants instead of also having to keep up with low growth.

It also varies from region to region. You know, in a slower growing region like Massachusetts and Vermont it's much more possible.

I know in the past I've done work in Hawaii where they were growing at 7 percent a year. And I'm not saying efficiency can get up to that level, but in many states you can cancel out load growth.

Here is some of the targets that had been set. I believe we're up to about 20 states that have set targets of 10 percent savings or more by 2020.

And here is a map showing the states that have set energy saving targets. And when I say targets, I mean mandatory targets. Like there are some voluntary targets in Virginia, which we shade differently because voluntary Utah also has them.

But we're up to 27 states where either they've set them or they're getting very close.

They have legislation they're trying to implement them now.

So far, the last time we looked at it, about 10 states were actively implementing the meaning that they had already -- the first target had already taken effect. In all cases they met the targets or where the targets hadn't quite taken effect yet. I mean, they hadn't hit an end date. They were on track.

The majority of states are still developing regulations and have yet to start programs. And I would note that while the success has been very good so far, there are a couple of states with very challenging targets that I suspect might be running a little behind. I'm not expecting every single to ultimately hit the targets, but so far the track record has been quite good.

We're planning in this next year to look again at this. This was something we did last year, but we think in 2011 there'll be a lot more

data. We're very interested not just in getting the policies in place but evaluating what's working, what's not, and how we can learn from that.

I would point out -- and I'll take -- I'm sure Ralph would speak up -- that in order to do efficiency, you have to get the business case right, so decoupling comes up, lost revenues, other approaches. There's a map from NRDC showing the status of decoupling as of -- I think it was May. There may be an updated version, Ralph. I don't know.

MR. CAVANAGH: It's about a dozen states and the District of Columbia.

MR. NADEL: Okay. And then likewise performance incentives are very important. This is from the Institute for Electric Efficiency and their current map of status.

And in the corner for those of you who were around awhile ago, you may have remembered John Rowe's speech back in -- I think it was --

about 1990. John was then the CEO of New England Electric and on national grid, and he talked about the rat smelling the cheese.

I would note also that there are some significant opportunities at wholesale level. I don't claim to be an expert in wholesale markets as I think some of you are. So I'd be very interested in what you have to suggest.

But forward capacity markets -- ISO New England and PJM have done quite a bit with energy efficiency and forward capacity markets. I know FERC has a docket on transmission planning. There are quite a few comments submitted to include energy efficiency as part of that.

FERC also has an open docket on paying locational, marginal prices for demand response. It occurs to us that you could perhaps -- and perhaps should do that also for energy efficiency so that all the different resources compete on a level field.

That said, there are lots of issues to

work on. I'm not just saying this is, you know, in a stroke of the wand it could be done, but I think it is worth looking at. And there may be other creative ideas as well.

This is an example -- this is the results as of earlier this month from the ISO New England forward capacity market auctions. They've gotten a little over 3,000 megawatts cleared in that, and about a third of that has been energy efficiency.

I mentioned appliance standards as being very important. This chart shows total U.S. energy use in the green for 2000 and approximately for 2010. That's an EIA estimate for this year as well as EIA projections going forward. The orange is our estimates of the savings from existing appliance standards -- these ones that are law, regulations. They've already been promulgated, not including anything that is pending; but we're talking by 2030 once the stock of products now out there is turned

over, about a 12 percent reduction in electricity use as a result of all the standards.

Ralph?

MR. CAVANAGH: Just appliances and not buildings, too?

MR. NADEL: This is just appliance and equipment standards, not buildings.

Likewise, it's from a study looking just at the rule makings that DOE now has open. We see about another 4 percent savings potential from those new standards.

DOE has announced -- I don't know whether Cathy Zoi even mentioned it earlier, but they want to look at adding new products. Congress is also talking about adding new products though - 4 percent and quite possibly higher.

Likewise, building codes -- Ralph, this is a chart from DOE looking at building codes. If 1975 was a hundred with the new IECC, which is due to be finalized this weekend in Charlotte, it's looking like they'll get down to just about

50 percent of what that old target was. There's been a recent target -- you can see in the yellow -- of trying to get 30 percent savings over a few IECC cycles. And I was told as of last night the books are going well, and it looks like they're going to hit that target.

Likewise, commercial even more so. We're down with the just finalized ASHRAE 90.1 standard for 2010. We're down probably close to 40 percent savings -- I'm sorry, a 60 percent savings. We're down to 40 percent of what the use used to be. So major progress there.

Obviously these are codes. If you follow the codes, there is -- oh, I'd say two-thirds of the states have adopted reasonably up-to-date codes, but attention's also needed on code implementation. We need to do a lot more than just get it on the books.

So, a few conclusions: large cost effective savings available. I'll say 20 percent plus. And for purposes of the near term, I don't

think we have to determine whether it's 20 percent or 30 percent. It's just large, and we should pursue it.

I would say that the U.S. needs these savings to stay competitive. Just in today's *Washington Post* there was a section on China and all that they're doing. I do a fair amount of work there, and yeah, they -- you know, they have Cabinet meetings devoted to energy efficiency and action plans. And they're really paying attention to that. So, if we want to stay competitive, we need to, I think, even redouble our efforts.

Many approaches for capturing these savings -- I talked about IRP and the Energy Efficiency Research standard which seem to be particularly common. Codes and standards -- very important. And I think it's work exploring options at the wholesale level.

And finally, for energy efficiency to really work, it has to make sense from a business

level to the utilities; and we have to pay attention to those issues. We can't ignore them whether it's decoupling, lost revenues, et cetera.

So, that's my whirlwind tour of energy efficiency in electric power markets.

MR. COWART: All right. Thank you, Steve.

And we're just going to keep on a roll here and move right into the demand response presentation from Dave Kathan.

MR. KATHAN: Hi, I'm David Kathan. I'm with the Office of Energy Policy and Innovation at the Federal Energy Regulatory Commission. And I've been invited to present on demand response as a power system resource.

So I'm -- don't have as many slides as Steve, but I'm going to go through some of the high points on what is happening and some of the actions that FERC has been doing on the subject and also list a number of key issues and

challenges that have been faced.

I always like to start with the slide like this because one of the key issues of demand response is: What is demand response. And the way that we define demand response is, you know, unlike energy efficiency, we're focusing more on the short term and on the reductions in consumption of electric energy at, you know, off of a usage in a short period of time.

It's a reaction to price, and it's a reaction to a signal that may be associated with local or grid-wise emergencies or transmission congestion.

We -- most recently in our action plan and demand response, which I'll talk about in a few moments, we actually broadened this definition a little bit to -- instead of just focusing on peak and, frequently, what people think about demand response is that these changes can happen throughout the load profile. And that's to recognize that there is a potential

role, especially in, you know, supporting variable resources, possibly in supporting electric vehicles. That may not be happening at the time of the system peak. So, that's been a broadening that we have encouraged and looked at.

This is a busy slide, but I do like it. NERC produced this nice classification as to support a -- some action they're doing. They're developing a database on demand response. It's the Demand Response Availability Data System -- DADS -- and similar to the TADS and GADS systems.

And what they're going to be collecting, starting, I believe, in January -- I believe that's right, David -- data on demand response and particularly on the events. And they're going to classify it along these various levels.

I'm not going to go down in each of the ones at the bottom, but the bottom line is that demand response can be viewed as dispatchable and non-dispatchable. Non-dispatchable is mostly geared on the dynamic pricing, the time of use

pricing, critical peak pricing area, while the dispatchable, you're moving to more where a system operator or a utility, a load-serving entity can potentially use the demand response in order to meet its needs or to, you know, solve particular problems.

And within that there are two varieties: reliability and economic. Reliability are much more focused on, you know, correcting or providing a resource -- you know, whether in its capacity or providing a operating reserve support. And then the economic is more of a market-based economic-type of program where a customer or an aggregator of customer resources will bid in demand response into those markets.

So, that's how we've been looking at it. And we have been examining partly through the request of Congress -- we were -- in 2009 produced a report which looked at the assessment of a demand response potential across the United States. And this is at a very high level -- how

much is -- we're saying is potential.

The top line is -- is looking at the electric demand forecast based on the NERC forecast at that point when we were doing it without demand response included. NERC does actually incorporate load management -- controllable load management. We pulled that out of their forecast to come up with that top line.

The second line is -- builds demand back into it, looking at what we've seen from our surveys and analyses that we've done. And that's just -- you know, what -- if you continued existing programs the way they are right now.

The next three lines are the policy scenarios. And they provide a spectrum of what you could be doing. The first -- the green line is looking at if you were to take the existing type of programs -- the retail and the wholesale Programs that exist right now -- and expand them throughout the country cost effectively and at industry leading, you know, participation by

customers.

With that we can -- say you can move up from a 38 gigawatts, which is about 4 percent of peak demand in 2019 up to 9 percent.

The next two lines are more aggressive, and they're mainly focused on bringing in a lot of priced-driven demand response to where you're incorporating the ability for customers to see prices.

The bottom line is mandatory dynamic pricing throughout the country. Advanced Meter infrastructure (AMI) throughout the country -- so it's -- there is policy choices between those -- and all -- from the red line all the way down to the orange line.

Just to go a little bit of detail about that, you know, expanded business -- I mean the business as usual which is -- this is a flavor of how demand response is happening in -- as of 2008.

We are required also by Congress to

produce an annual report on demand response and advanced metering. We do a survey every two years. This is based on our 2008 report and survey.

By the way, we're in the process of analyzing data we collected this year; and we hope to come out in the near term with our 2010 analysis. And so you'll see an updated set of data on this.

But the take-aways from this figure are that, you know, there is a fair amount of demand response in some key regions, particularly the reliability first in the Midwest -- in the upper Midwest and the Midwest -- I forget what MRO stands for; but northeast and in the southeast.

And the other thing to take away is that there's a fair amount of wholesale demand response. And that's largely coming out of the RTO programs. These are the various, you know, type of wholesale programs that are operated in those regions.

But industrial customers provide a large part of the demand response and a lot of the wholesale numbers are provided ultimately by wholesale -- industrial customers, also.

One other final comment is there is a reasonable amount of residential demand response that does occur, particularly in Florida, in the Midwest in the Reliability First Corporation.

And the bottom indicates the percentage of peak load of which in the Midwest there is a lot of demand response potential from interoperables and from the various direct load control programs.

So, we are also -- follow on to the assessment Congress has to develop a national action plan on demand response. That's to identify what is needed in order to achieve those potentials forecasted in the assessment.

And we put out our action plan this past June. It was developed through a full and open and transparent process where we put out several

drafts throughout the process. We held a techno conference. We -- there's a whole docket in which you can go and see the comments, see the drafts, see the transcript from the techno conference. Based on all that we developed our final action and then produced it.

The URL down is for the report, but all of the information and also the modeling that goes behind the assessment is also available on our website, and that's at a regional level. There's lots of detail even at the state level; so, all that is available for people to take a look at if you're interested.

One final comment is on the action plan. We are currently working with Pat's office at DOE on getting an implementation proposal in front of Congress. And they requested -- and after we finish the action plan to develop an implementation proposal. We've been working together. We're nearing completion on it; and hopefully, we will get it through review and out

in the near term.

Just a few comments on what's included in the action plan. I'm not going to go into detail -- is there are three areas that are included and we identified as needed in order to achieve that potential. One is the states. There are certain, you know, information access to the latest and best practices, you know, potential regulations, what other states are doing that is -- would be nice to have.

In some regards this is an extension of the work that DOE does in Pat's office, which is to make sure and be available to answer questions, be able to provide information.

There's also tools and materials that are -- we identified as being needed. One of them is, you know, looking at, you know, the cost effectiveness test. Is there a need to do a more accurate and more focused look at some of the costs and benefits associated with that?

But also like the detailed model was --

talked about renewable, there, perhaps, is a need to look at how models actually do model demand response. Right now it -- from my observation it's typically either you take it off the top in saying we have this amount of demand response potential and take it off and then plan based on that.

And there are some other models which will look at demand response as a resource as an option and will then look at -- and then will dispatch accordingly.

And so I think there is some more need to be looking at how that is being applied, but we identify several other ones.

The last and probably the most important and the one that's gotten a lot of attention in this past year or so, especially after some of the experience in Texas and out in California in Bakersfield, is the need to do customer engagement and community customer education.

Customers -- you know, if they don't have

the information will -- you know, potentially will draw lots of the wrong conclusions and there is a definite need to develop messages, develop a common sense of what is demand response, and make sure -- maybe even change the term demand response. You know, most of the focus groups have indicated people don't know what that means. It's not something that really -- they can respond to. So, that's items that we identified as key needs as part of the action plan.

Why is this not -- there we go.

MR. CAVANAGH: What's the alternative to demand response?

MR. KATHAN: Well -- what is the alternative? Well, there's - some that have been put out there: smart energy use, you know is one that I -- you know, we put out in the action plan.

Just to give an example, there is the collaborative that NARUC and FERC have been running. They've combined the Smart Grid and the

demand response collaborative, and it's the smart response in the collaborative.

So there are some -- you know, it needs to be tested. So I think there are -- we're looking for creativity in that regard.

MS. WELCH: Energy efficiency plus.

MR. KATHAN: Energy efficiency plus Pat just suggested. So --

(Laughter.)

MR. KATHAN: The -- so I'm -- I don't want to slight the states here. The states have been doing a lot of work on this area. They've been doing it for decades. You know, key states right now like Maryland, Illinois, Texas, California have been working on this area.

I'm going to focus on what we at the Commission have been doing. Over the last 10 years or so we have been processing and approving various changes and developing demand response at the wholesale level. And I won't go into detail on that, but I'm going to go through a number of

the rule makings that we have been doing in recent past.

Order Number 890 was a, you know, a major effort during Joe Kelliher's days to do reform of the open access transmission tariff. Demand response was in there in -- basically saying when you're doing transmission process, you should do it on -- include demand resources, including energy efficiency on a comparable basis with other resources.

Order Number 719 on wholesale competition -- there was a number of changes to wholesale markets will incorporate demand response. The basic principle is to make sure that demand response is incorporated on a comparable basis to other resources.

And key changes -- probably the most important and the one that's been more controversial is allowing aggregators of retail customers, which are like curtailment service providers, to be able to participate in wholesale

open markets. And that's -- you know, we're still going through compliance reports and compliance orders on that issue.

Most recently we put out -- in March -- a Notice of Proposed Rule Making on compensation for demand response in which we proposed that payments be paid at -- in all hours at the market price of energy -- essentially the Locational Market Price(LMP price).

That is also controversial. We have gone through several rounds of comments now. We had a techno conference in September, and we're examining the comments now. So this is -- what we're still looking at, you know, some of these major issues -- the transmission planning. Notice of Proposed Rulemaking (NOPR) -- I didn't have on this list - is also -- has demand resources as a part of what's being looked at. And comments were received on that.

We've -- less formally we have been participating in the interconnection-wide plant

and modeling efforts that Department of Energy has been funding. I'm aware of -- you know, especially in the west, some very focused look at demand resources. And I believe they've been using some of our numbers from the -- our surveys and from the assessments as what some of their scenarios they've been looking at.

And, finally, we haven't adopted any yet, but one of our requirements and that was in the Energy Policy Act of 2005 was that we -- I'm sorry, this was the Energy Independence and Security Act was we would be the entity who would adopt Smart Grid interoperability standards when they came to us and it -- after reaching a sufficient consensus.

Right now we have set about four that have just been, you know, provided to us; and we've opened up a docket and we will be coming out -- we have a Notice of Proposed Rule Making like we do in both for the NERC standards and for the North American Energy Standards Board. And

we have standards. We go through a process of a NOPR and then a final rule. So, that -- as we -- you know, the go through and more standards are brought to us, you know, there will, I think, be a very important movement.

The final thing I wanted to talk about was a -- you know, what I think are some issues and challenges that still exist on demand response. And I don't want to forget one, so I'm going to talk about it first, which I don't have up here.

As has been indicated by several of the other speakers thus far, there's an issue and a challenge but also a possible, you know benefit from demand response is the use of demand response to support variable resources, you know. I think that was clearly shown what happened in Texas where there was a drop in wind in the western part of Texas, and because of the load acting as resources was able to quickly respond to the frequency drop that happened. There was a

-- you know, the reliability was maintained. And I think there's been some other cases of that also, but that's going to -- as you bring in more variable generation, you may need more quick response, demand resources, storage in order to help support variable generation.

So, as far as -- as each of these challenges -- in Order 719 we did address several of the market rules that we were -- felt were not --

MR. COWART: You're going to have to summarize this.

MR. KATHAN: Okay. I'm told by Rich that I need to go through this quickly, so I'll just -- we're going to give it the short version of each of these.

Market rules -- we're -- there are certain market rules that even after 719 that we have -- we still feel there's possible changes that need to be happen. We're looking at various compliances on that.

There's a shared state and federal jurisdiction. It's not necessarily a bad thing but just complicates things and has led us to work closely with the states on demand response. We have a collaborative -- I mentioned earlier where we examine some of the issues. We have to give deference to state authority even in Order 719 when we opened up the ability for aggregators to participate. We said that unless states or local authorities prohibit those resources -- I mean, from participating. So we understand that there is a definite, you know, overlap, and I want to make sure that it was done correctly.

M and V -- measure and verification still is a challenge. North American Standards Board (NAESB) has been working on this issue. I'm still curious what it will -- they're coming out with. We've been directing them to go and provide some more detail on how measurement and verification should be looked at.

There has been disagreement over cost

effectiveness, whether it incorporates certain benefits or certain costs, some concerns about the uncertainty of benefits -- that was clearly seen in the Maryland orders on Baltimore Gas and Electric and PEPCO even though they were looking at like a three -- you know, a cost-benefit test ratio of about three in some of them. They were saying we are not sure those benefits will happen. So there's definitely some uncertainty and concern about benefits.

NERC just this past week in its long-term reliability assessment has identified that there is a potential issues of reliability, predictability, and sustainability. These are issues that have been raised by, you know, ISO New England and PJM. The issue is -- is there going to be customer fatigue -- you know, how sustainable are these resources.

I already indicated about customer education and awareness. There is a lack of sufficient deployment of enabling technologies.

And that's just not AMI, it's those feedback devices that Steve was talking about. It's devices that can respond, and in order to get to there, we need open standards.

And that's -- you know, we're working towards that, and there's a lot of actions happening at National Institute for Standards and Technology (NIST) to develop standards that allow devices to talk amongst each other. And there's -- I see a lot of great progress happening on that area.

And finally, you know, there -- that policy scenario I had on the assessment which was showing 20 percent, that was driven by dynamic pricing. And as of right now, you know, we're seeing -- you're still seeing a very limited amount of dynamic pricing, especially in the residential sector. Many of the large customers are on some form of dynamic pricing, but as you see more of that as more Smart Grid happens, there may be some more of that value creation and

benefits that can happen from dynamic pricing, so that's what I have.

MR. COWART: All right. Thank you.

I think maybe if you want to take a seat.

And one of the things that I -- before our speakers need to depart, I would like to give them the chance, for sure, to be able to say to the Committee -- each of you -- you know, what is it that you think this committee could address and how might we be able to assist the Department in improving the contribution of efficiency and demand response as a power system resource.

So, maybe I can just start with that question to both of you -- that is, not about the topic in general, but about what this committee should focus on.

MR. CAVANAGH: Mr. Chairman, since Nadel wrote the section on energy efficiency in the 2009 report of the Electricity Advisory Board, maybe he could tell us what we should add to it.

MR. NADEL: That assumes I have read it

lately, and I should have, and I confess I have not.

MR. CAVANAGH: You presented on it.

MR. NADEL: Right, I did.

In terms of what this Committee can do, I mean, obviously, it is a national committee with representation throughout the country, many different interests -- to the extent you can have some consensus, what should be done at the national level or I'll say the regional level, meaning multi states, that could be very useful. Likewise, what can be done at the wholesale level? You know, my understanding is FERC is very interested in these issues and I think would look seriously at any proposals this Committee have. I know the Chairman is very interested in energy efficiency and demand response. So, what could be done at that national or regional level.

The other thing is if you looked at some of my maps, you saw that to over generalize is lots of energy efficiency happening on the west

coast, the southwest, the northeast, and the Midwest. There's kind of a swath of states that by and large are not doing as much. They go from North Dakota and Wyoming through to Georgia, and any type of advice, assistance, tools, et cetera that can be provided to those states to, you know, as we see it, you know, roughly 30 states are doing something significant and 20 states are not; and how do we help those states to do it because it's not just in their states' interest, but since we're all linked in power poles, we're all linked in international markets, and all of our interests are not just strictly a states we'll do whatever they want, and everybody is totally fine with that.

MR. COWART: Okay, thanks.

MR. KATHAN: Well, I think I've already identified in our action plan some of the key issues that I think needs to be done on the national level. A lot of that is really more support for some additional research on specific

items, whether it's, you know, more understanding or developing the best practices on measurement and verification, cost effectiveness, you know, supporting, you know, customers, states to understand, you know, what is demand response, what is energy efficiency, what are the best policies in order to do it. And I would say just continued support for some of the, you know, actions that are happening at the NIST level and at the state level helping them under -- you know, to work towards developing, you know, a more dynamic and increased amount of memory sources.

MR. COWART: We should turn to comments from the Committee.

I saw Brad had his card up for the longest time, so we should start with you.

MR. ROBERTS: Thank you.

David, a couple questions: In your looking in your Chart 4, you had demand growth and you talked a lot about demand response.

I agree, as a side comment, that demand response is not necessarily all load going down. It might be going up as well. Did you take into account any growth in electric vehicle charging or --

MR. KATHAN: Not directly, you know, but we definitely see that as a -- you know, as a key possible use. We were more focusing on looking at the demand as project and then taking demand response as a way to adjust that; but definitely, it's something to be -- that needs to be examined.

`MR. COWART: Okay. Over to this side next.

MR. HEYECK: I really appreciate the presentations. It's absolutely the right thing we need to do.

One of the things, though, that we must -- for planning purposes more to NERC's point -- we must make sure that these things are sustainable.

The other thing that I'd like to remind folks is like in Europe even though they have the 20-20-20 initiative, they're going to achieve that by having more of their energy electrified. So there is going to be greater demand where processes become more electrified and certainly transportation. And I believe the McKinsey Report was talking about stationary load, not the transportation element of load.

For all of this, though, we must remember that when we invented lite beer, we just drank more beer. So, for --

(Laughter.)

MR. HEYECK: There is an element of personal income or wealth. If personal income grows in this country, electricity provides comfort, and people will find it. So we've got to make sure that in our models of future growth we include a bound -- or bandwidth of potential growth with demand response and with energy efficiency.

The last comment is one of the game changers here is distributed generation. And to the extent that that offset, we must not preclude that.

MR. COWART: Coming up this way - Ralph.

MR. CAVANAGH: MR. Chairman, just for our agenda on energy efficiency and electricity efficiency, the U.S. university system needs some bulking up in this area.

The United States has more than 30 university centers on nuclear engineering, and I'm glad for every one of them. Outside California there are no university centers on energy efficiency. And until this week when one was inaugurated -- I'm delighted to report -- in Boise, Idaho, and the Governor of Idaho invoked the U.S. Department of Energy's leadership on energy efficiency and noted his gratification it being the first state outside California to establish a center.

There ought to be a lot more, and let's

see if we can't do something to identify opportunities and help DOE find some ways to spur that growth. Ought to be one in Wisconsin it seems to me for one thing.

(Laughter.)

MR. COWART: Rick.

MR. BOWEN: A couple things: as an aluminum producer, we appreciate the movement to lite beer.

(Laughter.)

MR. BOWEN: I'm happy to say that, but no, in all seriousness, I think you have two different aspects of things here. One of them's energy efficiency, which as a save energy now signator, we're way on board with that and certainly support that. I think that that is a long-term and a sustainable thing I should say.

Although, most of us recognize that as producers of products sometimes that's a one-time thing that you can't repeat over and over again. You can at different locations, so I think that

has to be considered as we talk about transmission issues and where that goes.

I would say -- and I appreciate the comment by Michael there on sustainability. We also participate in demand response, particularly in the MISO. We're way into that. I would say that, boy, we're very supportive of the work that FERC is doing around demand response in trying to get some stuff in place on that because it really only occurs in organized markets, as you know, that are competitive markets where the ISOs, or MISOs, or whatever you might want to call them have those type of products available to those of us that are consumers.

As an example, we in the MISO participate in a Type 1. We've participated every day for 251 days, I think, as of yesterday and have been, I guess, say, a function on that 40 different times, meaning they've called upon us under the demand response scheme, and we've obviously responded to those 40 times.

MR. CAVANAH: Are you fatigued?

MR. BOWEN: Yeah, we're getting a little tired, but no, in all seriousness, I think the piece to that, though, that has to be considered on his sustainability comment is that comes at a price. Okay, and so, demand response, unlike energy efficiency, one is a market-priced product, okay; and so, we have to understand on demand response that people reaction -- reacting because of that.

So, it's kind of like as we kind of look through these studies that NERC and others have done on generation requirements, the amount of -- that we have and 20 percent and stuff like that right now, that's because load's off. We have to assume it's going to come back.

The same thing with demand response -- we have to understand that people like ourselves and other chemical producers and stuff, the reason why we're willing to participate in IS-10 and IS-30 type programs is because the value of our

product right now is down low. When the value of that product goes up, then you have to ask your question will they be there; and I think that's something you have to think about.

You know, when the economy recovers, how much of the demand response is going to be there? And it may still be there, but the price of that product, as I think FERC has recognized in their reports, has to change. It is a changing price because you're foregoing an opportunity, and that foregoance is a -- is usually equated to a dollar value. So we have to think about them kind of two separate ways.

And I appreciate the work both these guys have done. I think they're really good stuff. Thanks.

MR. COWART: Fred.

MR. BUTLER: Yes, thank you. I appreciated both presentations, and I want to explore the comment that I think was made by you, David, on the interaction between Smart Grid and

some of these things and how in the Smart Grid Subcommittee we will want to talk more about the concept you raise in terms of the ability of the Smart Grid to facilitate energy efficiency and demand response because I think that's an important way to avoid what Michael pointed out as the, you know, invent lite beer and people drink more beer.

We need to just focus on how this can affect people's bills, not simply their usage but their bills which will get their attention, and that maybe the Smart Grid can gain some proponents and some people who want to have this out there at the rate-payer level because it will affect their bills and lower their bills, and that there's a way to work together on this.

So, this is, I guess, an open invitation for you to work with us as we go forward with the Smart Grid Subcommittee.

MR. COWART: Let's go -- let's just go down this side. Jim -- Joe.

MR. KELLIHER: I just have a question regarding David's second bullet there. And I think that's very elegantly stated -- shared federal and state jurisdiction. It's much better than blurred or ambiguous but shared is a nice concept.

And I guess my question is -- or even better than contentious --

MR. KATHAN: Well, I mean, I think it's -- I think given that --

MR. KELLIHER: It is blurry, I think, the federal and state governments have gotten along really well in this area because I think there's a concert at least in top direction -- there's directional agreement.

But is it tenable this sharing, or blur, or ambiguity? If it is tenable, then fine; but it just seems at some point when retail consumers are reselling demand response into a wholesale market, it sort of seems that they look like a wholesale seller rather than a retail consumer,

and at some point that is going to be tested by the courts and who knows what they say.

And it just would be unfortunate if the country's relying on demand response in a really significant way and then the whole -- the whole underpinning is tossed out by the court. So, if there's going to -- I'm optimistic about the possibility of -- Lauren's already laughing -- about the possibility of energy legislation in the next Congress because it's a kind of thing that naturally is bipartisan or non-partisan. It can be perversely made partisan through supreme efforts; and maybe those efforts will be made.

But if there is, energy efficiency will be a big part of it. Should there be an attempt to try to clarify jurisdiction, or is that just hopelessly difficult, and we just should all let it ride that a legal challenge won't occur or that a legal challenge will just affirm whatever assumptions underpin federal policy in this area?

Not a short question, I'm sorry, but --

and that's not necessarily direct -- you can take it if you want; but I understand you prudentially might not want to, and maybe --

(Laughter.)

MR. KATHAN: I was going to say I could not take it, and largely because those are sort of key legal questions.

MR. KELLIHER: Yeah, I - well, maybe a -- it's actually -- I should have said it. I wanted the state regulator to react to you, but if it --

MR. KATHAN: Right.

MR. KATHAN: So that's the question really. Do state regulators feel the need either former or -- former or current state regulators feel the need that there should be a clarification? It's really just an honest question.

I'm not -- I just get a little uneasy thinking this arrangement is reflected (inaudible) 1935 and letting it all ride in a big way is -- does present some challenges.

MS. AZAR: There will be litigation unless it's determined by Congress.

MR. COWART: In which case I take your question to be a question, should this Committee think about that question and perhaps make a recommendation. That's -- that's at least a question for us to think about.

I wanted to -- our next topic --

MR. KATHAN: I actually want to just make -- there is a upcoming conference which the Peak Load Management Alliance is actually sponsoring in D.C. in the early part of December law and demand response. So, you might want to look that up.

I think former chairman Jim Hecker is taking a large part in setting that up.

MR. COWART: It seems appropriate to give Mike Weedall the last comment here before we break for lunch.

MR. WEEDALL: Great. Thanks, Rich.

Two quick comments: One is -- and Steve

just left, but he noted in his slides the question about the wholesale level with these tools. And I would certainly encourage that, indeed, I think there is a very robust, you know, activity that can take place there, certainly, you know, as both Rich and Ralph know because they participated in a terrific steering group that we had.

We changed our transmission planning process a number of years ago where we now have to look at the demand side before we go ahead and, you know, actually construct any line.

And I can tell you we never made any formal announcements, but there have been a couple of construction projects that just quietly faded away when, you know, the magnifying glass was brought forth. So, certainly, you know, that's, you know, something that, you know, I think we can help share with others.

The second thing is just to talk on the energy efficiency side as far as what's needed.

If you, again, go back to the Sixth Power Plan where we are targeting 85 percent of load growth to be met through energy efficiency over the next 20 years, 50 percent of the technologies needed to deliver those savings are not commercially available today. And so, you know, we're done with CFLs in the Northwest. We've got to find a whole new set of tools to use.

And certainly we've been working with EPRI and some other folks. We'll be having a meeting that Steve, again, referenced next week here in D.C., to talk about how to bring more of a demonstration of what, you know, moving those technologies rapidly into the marketplace so we can have the savings. And I could go on for a long time about that.

We've had terrific success in the Northwest inventing a whole new industry around ductless heat pumps. It's a great one. You've got a lousy economy, and you can actually put some people back to work with a brand new

technology, but -- thanks.

MR. COWART: I was tempting --

MR. SMITHERMAN: Very quickly, Rich.

In response to your question, what I was hoping to hear from David and Steve was we need to deploy Smart Meters. I mean, you can't manage it if you can't measure it. And both energy efficiency and demand response at the residential and small commercial level, I think, is absolutely predicated upon the customer having good information. And you're going to get that with small -- with Smart Meters, so I know some people may not be as big a fan of them as I am, but you know, five years from now I think we're going to wonder what we ever did without them in terms of managing consumption and giving customers the information to make a more intelligent decision about how much to buy and when to buy it.

MR. COWART: All right. Thank you all.

Now, one thing I didn't do this morning,

but I think you-all have already been in close contact with Peggy Welch; but Peggy, as you know, has been doing everything to support the work of this committee, and I want to thank her publicly for that. And I know she's probably taking care of something right now.

MS. WELCH: Smiling.

MR. COWART: Oh, there she is. She's - anyway, so thank you, Peggy.

(Applause.)

MR. COWART: And it's also appropriate -- I was going to do this at the end of the day, but I'll do it right now -- to thank our hosts.

This is -- people have been sidling up to me and saying, hey, this is a great meeting place. Can we meet here again?

And I just want to -- this is terrific. Thank you so much.

Anyway, it's time to take a break for lunch. You'll see that this agenda is so incredibly packed that lunch is actually way

shorter than normal. And we're going to reconvene at 1:15 because we're going to need to have, you know, secure to ourselves some time for discussion to reflect on everything we've heard today and your ideas about work going forward.

At -- we always reserve a half hour at the end for public comments because the public has a right to comment on the work of the Committee. And -- but members of the public who want to address the Committee need to tell Peggy and get on a list. So that's one -- another thing that happens at the very end of our day, we'll hear from the public.

And we will adjourn at 3:00 o'clock. I realize everybody's got tight travel plans, and we really will -- we really will adjourn at 3:00 o'clock.

So, that said, we're going to adjourn for lunch right now, and Peggy's going to tell us -- is it right in the next room?

MS. WELCH: Yes.

(Brief Recess.)

AFTERNOON SESSION

MR. COWART: Okay, folks. As much as I hate to interrupt what I'm sure is great conversation in small groups, why don't we come together and continue our conversation all together.

(Pause.)

MR. COWART: That was very responsive. I'm impressed.

(Inaudible.)

MR. COWART: And that's it. I am really

a fearsome character.

So, we have -- we have some time -- and not a whole lot of time, actually, to reflect on really a bunch of things. I'm putting them in three categories. One, the category of all the presentations we heard this morning and the discussions we began that kind of tee up some of the major issues. Second, is the short memo that you have of potential study -- what we call Potential Study Topics. The third thing, of course, would be other ideas that you-all have about organization of the Committee, and focus, and potential projects for the Committee. And I guess I want to say a couple things just to get us going.

The first is, as we were organizing the Committee this time, I asked the Department, is this the Electricity Advisory Committee, or is this the Electricity Distribution and Transmission Advisory Committee.

And the answer was it's the Electricity

Advisory Committee. And so we would not in any way regard ourselves as being constraint to thinking about delivery as the subject matter jurisdiction of the committee.

And I notice Pat's not screaming, and so I'm sure that this is correct.

So, that's the first thing. So we ought to be thinking beyond just thinking, oh, this is just the Office of Delivery.

The second point is to reiterate something that was said earlier today that we should think of different kinds of work products and activities. We could deliver recommendations or observations to the Department in the form of short memos, an issue brief. It doesn't have to be a big, long, drawn out 10-month or 12-month study. And I think there's a real appetite on the part of the Department for really more proactively getting advice out of us rather than having us commission studies.

And I see serious nodding going on there,

so I'm sure that's true.

So, maybe -- oh, and the last thing I want to say is we're going to hand around two sign-up sheets. One is the sign-up sheet for the subcommittee on storage; one is for the subcommittee on Smart Grids. And --

MS. WELCH: Actually, the sign-up sheet has both.

MR. COWART: Oh, it's one sign-up sheet for both. All right.

Here we go. I should turn -- oh, yeah.

MS. WELSH: Two copies.

MR. COWART: Two copies. I'll send one in each direction.

And maybe I need to be reminded of the numbers. We're required to have 15 members on the -

MR. MEYER: Fifteen on the Smart Grid and 8 on the Storage.

MR. COWART: Okay. So --

MR. MASIELLO: Don't let that hold you

back.

MR. COWART: Yeah, don't let -- don't let that hold you back. Just wanted to give you an idea that we definitely, you know, want significant participation on this -- on those two subcommittees.

MS. WELCH: And you can sign up for both. It's not an either or.

MR. COWART: Right.

MR. COWART: And I'm actually totally in favor of the creation of work teams or work groups on particular projects that may just exist for the purpose of doing X and then delivering the memo, or the advice memo, or whatever it is to report on X; and that doesn't have to be a permanently established thing at all.

So, and I -- at the end of this conversation we may decide that we want to create a couple of work teams and -- in addition to these two subcommittees.

In terms of the -- what happens next, two

things: David, and Peggy, and I were talking about the schedule for the coming year. We expect that we're going to be meeting three times annually face to face and that we -- we're trying to not expand it beyond that just because you-all are really busy and have many other important things to do, and we don't want to put too much of a burden on anybody. But three meetings gives us a chance to engage with each other like we have been today, which in a way that I find really productive; and it's giving me a very good feeling about how productive it's going to be.

Most likely, you know, if you looked at your calendar, we looked at our calendars, it looks like those -- we're going to pick dates and circulate them -- the next one being probably late February or early March where it's going to try not to conflict with the National Electricity Forum and the NARUC meetings.

MR. CURRY: Or Saint Patrick's Day.

(Laughter.)

MR. COWART: I -- then there's perhaps late June.

(Laughter.)

MR. COWART: Early July, not conflicting with July 4. And the next meeting sometime around a year from now, but we'll circulate those.

MR. VAGUE: The earlier you can get us certain dates, the better it is. It was very difficult making this meeting because of the late notice.

MR. COWART: Yeah, I appreciate that. I had the same problem.

And we will be circulating those very soon.

In between meetings the subcommittees can meet in a variety of ways, including -- in the past the subcommittees met even face to face on occasion; but conference calls, webinars -- you know, you name it in terms of getting together in work teams or subcommittees. There's a lot of

options there.

And what I'm going to suggest that we do is convene subcommittee chairs, and Lauren, and myself along with DOE staff and just kind of make a plan for the Committee going forward, following today's conversation.

I don't think we're going to necessarily sit here in the next hour and literally map out the work plan for the year; but we want to get input from all of you as to what you'd like to see on the work plan so that we can then feed that back to you.

So, if -- with those comments as a sort of a prelude, I am happy to proceed any way you-all want.

(Pause.)

MR. COWART: I didn't figure I'd have to wait a long time.

(Laughter.)

MR. COWART: You were just a little fast, too, Joe.

MR. KELLIHER: I really just want to ask a clarifying question. In terms of the ambit of the advice from the Advisory Committee -- and to me, there is kind of three cuts at it. And one is the -- we're advising the Office of OE on matters within its scope, and second is we're advising -- and my understanding is we're an advisory committee to OE, not to the Department.

But a second one would be advice sort of to or through OE on matters that are within the Department's authority. And the other is advice through OE, through DOE to the U.S. Government on matters that are within the U.S. Government's authority, in part because DOE has a planning role that isn't limited to DOE's actual authority.

And that third one, to me, is so broad that it -- it's -- we couldn't do all of that obviously; but -- so, to me it's more -- I wanted to sort of get an understanding is which of those three universes are we directed to -- OE's role,

DOE's role, or the entire U.S. Government's role?

MS. HOFFMAN: I'll go first and then David can chime in.

Actually, from my perspective it would be the third one, but the advice that I'm looking for or would recommend you consider is very focused. So -- so, we can talk about generalities; but it's really looking at -- for example, on some of the carbon discussions of this morning would be as studies come across, you're looking at CCS potentially for both natural gas and coal. You know, and look at advice that's really -- shouldn't have to cover the landscape, I guess, is what I'm saying.

I would like to have it open for beyond just OE, the Department. It could focus on other aspects of other agencies. It will be up to the -- it will be up to us on how we take that advice and use it.

MR. MEYER: So much of what DOE does -- both OE and other parts of DOE -- they succeed or

don't succeed depending on how effectively we work with other -- other parties -- whether it's states, other federal agencies, industry, whatever.

So, in that sense the broader perspective is highly relevant in terms of advice that you would give about who we should be working with and how. And I wouldn't -- I certainly would not want to see you limit -- I think the -- the effect that you can bring to bear is your instincts, your judgment, your sense of here is where the problem is, and here is how you can get at it.

We can figure the -- we can take it from there and try to make it work; but it's -- we need your help in picking appropriate things to focus on. That's critical here.

MR. COWART: Ralph. And then I'll work around that way and come back to Guido.

MR. CAVANAGH: Joe mentioned earlier the opportunity to clarify some of the jurisdictional

issues. And, in fact, historically, this committee in its earlier lifetimes has made some real contributions there. And you can see places in the -- particularly the Federal energy legislation in 2005 and 2007 where those recommendations were quite effective.

So, Pat, I would encourage you, also, to be -- going back and saying where is the greatest -- I mean, where are the greatest areas of concern and potential conflict.

One that I can see right now, for example, is I'm still not sure we've done enough to clarify and support regional transmission planning and siting. And we've had already some discussions around the table about that -- both in terms of clarifying the appropriate responsibilities, encouraging possibly the creation of new entities that don't now exist because we don't have much of a tradition of regional panning institutions and siting institutions in the United States. I mean, we

might want to consider doing more.

And finally, just issues of resource adequacy for the entities that are charged with making the kinds of decisions that are going to be critical if our aspirations are to be collectively realized.

You may be in the best position to identify where a consensus recommendation would be most helpful within the administration. And I think what you're getting is a real willingness around the table to work on that together. And I think you've got the right -- there will be some areas where we can't agree; but where we could, it would make a strong difference.

But I think we need to know from you where you think it'll be helpful.

(Inaudible.)

MR. HEYECK: Okay. Maybe we should study the price elasticity of lite beer, I guess.

(Laughter.)

MR. HEYECK: Just kidding, of course.

The -- I know in the last committee we looked at the third leg of the stool is electricity adequacy in the future. I guess as policy affects electricity adequacy or reliability, it would be -- I'd like it to be more narrow than that. That's a pretty broad topic.

But example would be the -- what we heard from the EPA Assistant Administrator today. That would be an example.

Another area that kind 9of -- there doesn't seem to be a natural convergence of rights of way for infrastructure. Transmission lines are separate from gas pipelines, are separate from roads, are separate from railroads. And it would be nice to study -- again, it would be nice to just put it on the list of how we can converge -- or what are the impediments of converging infrastructure right of way so that we can build what we need to build.

You know, one example that someone said

was electrifying the railroads is a great opportunity for superstructures to avoid the use of diesel. Electrify the railroads and use it as a corridor for extra high voltage transmission or HVDC transmission. So that's just another topic to look at.

I'm curious, though, the last point as Pat and David -- you're involved with a lot of R and D areas. If there's any area that you would like us to take a look at, we would be welcome at the time.

MR. COWART: Thank you. Um, this is reminding me of something.

I sat for a number of years on the Advisory Committee to the Electric Power Research Institute, and only after -- this shows you how slow I am. Only after sitting on the Committee for a couple years that I actually realized that they were advising us, but we weren't actually advising them in any organized way. We would talk about stuff, but they didn't actually ask us

a pointed question. They never actually said, should we do this, or should we do that. What's your opinion -- and because we didn't force ourselves to actually give focused advice.

And your last question reminds me that it would be very much more helpful and a much better use of all of our times if, in fact, you were to -- you and your colleagues would be feeding us potential questions of which, you know, we could take up a few and give pointed, focused answers.

I just want to make that plea that you don't be shy about asking us what you would like to have advice on.

MS. HOFFMAN: I actually would agree with that. It was something, I think, Ralph and I were talking at the break and that we need to come up with specific questions with respect to the topics that we're going to discuss that we really want some feedback on. So I agree.

MR. COWART: That's great. I said I was going to come around this way.

MS. REDER: Yeah, there has been a couple references throughout the day on the adequacy of work force. And I think, you know, as we embark upon all of these topics, it's well worth thinking about the attrition rates that we're facing as an industry. You know, in many pockets we're looking at over 50 percent, plus or minus, that will be attracting in the next five years.

So, it's an opportunity and a challenge. It's a challenge just to sustain what we have been doing, but then as we add all of these other technologies, I think it's even more so. And I think, you know, it's well worth trying to forecast it in the individual areas that we're trying to do. Highlight the risks, suggest mitigating factors, and highlight the situations so we consider it kind of a leg to the overall puzzle.

So, anyway, I'd like to see that kind of come forth as an element of our efforts.

MR. COWART: Thanks. Bob?

MR. GRAMLICH: Yeah, I'd like to suggest, too, I think relatively near term, bite-sized activities that are within the Department's jurisdiction related to transmission.

One is taking -- seeing if this group could reach a consensus on the Department's transmission corridor authority, and what, if anything, should be done with that at this point.

And I'd like to, you know, move that forward because if we don't finish it until a year from now, we'll be probably too late to get much done in that area.

MR. CAVANAGH: And because he wants to make my life hell.

MR. GRAMLICH: That's right. That's right.

But Ralph and I talked about a new -- new approach there, so I think -- I think there's an opportunity.

The other is -- and we spoke briefly with the Secretary last night about power marketing

administrations also within DOE and if -- if any of the 500 transmission owners in the country should be leaders on transmission infrastructure and integrating clean energy, you would think this administration's two PMAs should be -- should be there.

And I know they have significant constraints from many of their customers, but it's something that I'd like to see if we could work on some consensus on that.

Oh, and Cathy Zoi mentioned R and D priorities in this area. So that seems like clearly one that we should try to work on together.

MR. BARTELS: First of all, Rich, you and I have not met each other before, but I know what a Guido means in the U.S., so that's not how I pronounce my name, but -- no, we say Heedo (Phonetic.).

MR. COWART: Heedo.

MR. BARTELS: I'm probably the only non-

citizen here in the room.

But, now, sir, you said something --

MR. COWART: My deep apology.

MR. BARTELS: No, not a problem. I listen to everything.

So -- but, no, you said something at the beginning of the day, Richard, where you talked about how should we do this, should we do that, and you said, should we do more studies.

I didn't hear what Cathy said earlier on, and I think she made a comment about it. The one thought I had when you said that, absolutely not -- not more studies. I think we have studied many topics to death.

I also, of course, think there are some very good studies as the past immediate chair of this market subcommittee of ESE carried this passionately around, one thing I would advocate for is that the reports we have done by the three subcommittees that we look at what of that has been executed, what's still open, do we think

that's still valid, let's then put our force behind that.

I think for me the single most important thing is -- and I think about the word consensus and coordination. What I feel we all extricate for certain things, but I think where we really lack in for sure this country. I came just back from China now. They -- for them consensus is very easy, so I'm not advocating for that system over there; but they have consensus.

And I think what we often lack as an ecosystem. If you say, Pat, that you want to reach out more outside of the office, you want to reach out into an ecosystem where there's consensus. So, is there a consensus here around the table? Do we all have a common view how all these different technologies relate and fit together, how they can reinforce each other? That is not always (inaudible) some game, but you can really create synergies.

I think there is not. So, for me a very

important thing is let's look at what already has been studied and exists in reports, et cetera. But let's also really test ourselves.

I wrote on the back of this piece of paper, Pat, some comments; but it's actually goals of the EAC. It says should recognize that Smart Grid is enabling to managing emissions, renewable penetration, energy efficiency, energy storage.

Do we all agree on that point? I'm not sure.

So, I think that's a critical topic. And then I don't know. Can we look at topics which are perhaps too big to touch upon?

As we just had a month ago -- Pat, as you know, (inaudible) grid rise lines are a big event together with the DOE where we had Jeff Immelt speak who went on record by saying that the National Energy policy in the U.S. is stupid. I'm quoting.

And I was interviewed by the *Wall Street*

Journal and a whole article about Jeff Immelt, and somewhere it said, oh, and not everybody agrees. Bartels of IBM says it's easy to make excuses. It's not what I said, but okay, that was what the journalist wrote.

But on a serious note, I think it's about us as an ecosystem. Do we step up to the plate and do we have a consistent view how all these different topics relate? And I think that's, for me, the single most important thing to focus on.

MR. COWART: I should probably say to hoard them.

MR. BARTELS: You speak my language.

MR. VON WELIE: I'm a hybrid actually, so I can – so, Rich, I had two thoughts. The first -- I mentioned both of them to you at the break.

The first is really sort of a general concern, which is I think we need to be careful about scope in terms of what we tackle here. It's easy to get excited; there are so many topics out there. And I wonder about if we

spread ourselves too thin on the topic list whether we'll actually get anything done.

So I think having some discussion about what are the most important topics to tackle and then some prioritization, I think, would be a useful thing.

The second is a more -- having said that, I'll expand the scope in my second statement. And it's really in response to the question that Ed Krapels asked a little earlier on. If you recall, this was after the Gina McCarthy presentation on the impact of all these EPA rules.

And I noticed in the discussion topics that there's a focus on transmission with regard to integrating renewable, which clearly is appropriate and it has been a big discussion.

But there's not much said, I think, about transmission planning and planning for what is going to be the consequence of these EPA rules. And that was really the gist of the question from

Ed to myself.

And I know from -- just from a New England perspective, we're looking at a situation where about 25 percent of our installed capacity are oil-fired generators that are 30 to 40 years old and older today. They don't run very often anymore because the price of oil is so high.

And we're in a surplus situation with regard to our capacity market, so they're not getting much money in the capacity market; so we're looking at that and saying, well, we think that a lot of these units are just not going to be around 5 to 10 years from now.

Typically, I think the same is true in other parts of the country. And I guess I could argue that New England has sort of voluntarily done a lot of what the EPA wants to do to other parts of the country; and so, in that sense we're sort of a trial balloon for the rest of the country.

When we look at the situation in New

England, the question becomes one of how do you deal with those retirements because the system operators are going to be the first ones that say, no, you can't shut it down. The day it comes to be shut down, are we going to say, no, you can't shut it down because we've got a reliability problem?

And the conundrum here is that the system operators are typically also the area planners or the regional planners -- really can only plan for something once they know it's going to happen.

So, the constraint that I'm referring to here is that we can recognize a reliability need and go and solve it once the generator has said we're retiring; but we can't step in and say we think a generator's going to retire five years from now because there is so much pressure on them and start planning a transmission line to solve for that problem.

And so, that's a real conundrum because a transmission line might take six years to get

through the siting process, and we only get two to three year's warning through the forward capacity market that they're actually going to retire. And so the day comes when a lot of them start retiring in droves, what's going to happen is we're going to ask system operators to put them all onto RMR contracts and keep them alive while we go off and build transmission lines.

And we are not going to be very popular with system operators; and I think there is a connection here between how do you solve for that problem and how do you also solve for the integration of renewables. So, my point, I think, is they're sort of missing one-half of the equation here.

MR. COWART: Thank you. I am going to come back - come back around.

One topic I wanted to put on the table is just an outgrowth of this morning's conversation about the -- the EPA rule making -- some of the various rule makings we heard about and the

concern that reliability can be -- might be -- will be, depending on your point of view, affected by --

MR. CAVANAGH: Would be.

` MR COWART: Would be; right.

MR. CAVANAGH: Actually won't be.

MR. COWART: Or won't be; right -- by those sequence of rule makings.

And the -- and that led me to the thought that this committee could be very helpful in a short -- this is like a short hit kind of a thing for the Committee.

By urging the creation of a working relationship between DOE and EPA, that would not try to assess in advance the answer to the question -- that is, is there a big problem; isn't there a big problem; how big is it; where is it -- not try to solve that -- not to weigh in on that but rather to say listen, we can envision a process by which EPA when it's faced with this question, could call on DOE to ask for an

evaluation of a crunch -- an asserted crunch and also ask for some observations about how do you deal with this. You know, should there be a waiver? Should there be an extension? Should there be some form of investments in alternatives -- whatever it is, and that kind of agreement in advance between the two agencies would allow the government as a whole to put in place a system that is -- that does what we know will happen, which is that we want to avoid reliability crunches. We -- and we will as a nation avoid them one way or another but that it lets people know that we have a process established in advance so that this does not become a crisis every time the next rule is proposed.

So, I'll leave it at that, but it seems to me that that's what the agencies could do; and it also seems to me that this Committee has the right kind of people on it to be able to recommend a process that would do it. And I see that as a relatively short-term recommendation.

MR. COWART: I apologize. And we can take reactions to that. I just wanted to put that idea on the table along with -- I mean, the other ones. We're making a list.

Lauren? And I invite comments.

MS. AZAR: One of the things that always strikes me as -- and it struck me this morning already is we've been talking about these things already for years. And I think as Michael said this morning, there are technological answers to a lot of the things we've been discussing. It's the political barriers that are the problems.

Thought it may be difficult, I -- I would urge us to take on some of the 800-pound gorillas. And they are the political problems.

When I think about why we have not been moving forward even though we do know the answers, two things come to mind. First of all, who pays for it? We all know it's going to be really expensive; and we know that the expenses are going to be lumpy. They're going to be --

certain states are going to have to pay more than other states. Certain companies are going to hit more than other companies.

And because of that people are interfering with the process and saying, no, no, stop this process. Is there a way for us to figure out how to smooth out those lumps? I think that will help to reduce some of the barriers.

I think also with regards to some of the other barriers that are arising, it comes from the differentiations between regulated and non-regulated states. When we're talking about how these regulations and the changes we're talking about are going to be affected, it's quite different depending on whether you're in a regulated or unregulated state.

What Gordon was just discussing concerning retirements is a huge issue; but it's a really bad issue for deregulated states, right, because they don't know when the generators are

going to shut down.

Regulated states -- you can come up with much better ideas. So, figuring out a way in which -- you know, one size is not going to fit all in this -- in coming up with a solution. And I don't have a good answer for how to do it, but I do know I keep seeing the 800-pound gorilla, and it's -- it's twofold: unregulated versus regulated states and ultimately, who's going to pay because if we can't share the pain on some level -- and you can't use the word socialize -- but if you can't share the pain or at least, you know, somewhat soften the bumps, I don't think we're going to get anywhere. I think we're going to keep talking about this stuff for years.

MS. CRUTCHFIELD: So, Lauren, your discussion tied right to something I've been really challenged with in our -- in our discussion all day today.

So if we think our overarching question that's been presented to us in all of the

discussions this morning -- and someone said it very eloquently, and I'm sorry I can't remember who said it, but the question was posed -- how to achieve carbon reductions or emission reductions, those goals while maintaining reliability in the system in the most cost effective manner.

So that -- if that's the overarching question -- and, Rich, maybe you said that, but it is the compelling question. Who is the ultimate beneficiary of it? And it's our retail customers.

So, if we look at the question posed and assess the impact on the retail customer, clearly, the retail customers, whether they are Alcoa or are residential customers cannot afford reliability interruption. They just can't afford to experience poor reliability.

Then what are the common goals for both the federal government and the state government to achieve so that customers continue to benefit from good reliability while also we collectively

pursue carbon reduction targets?

I think if the Committee could prioritize for the federal government and ultimately for our state regulators some common goals we could achieve -- they're not jurisdictional issues. They are common goals like effective energy efficiency targets.

It's perplexing to me why some parts of the country have been very successful while other parts of the country haven't pursued energy efficiency efforts that benefit our retail cust6omers.

And knowing that we will in the future have resource adequacy constraints or challenges in fuel source why we can't just be real clear as a nation and establish some renewable targets and let's all go about achieving them.

If we could outline that for the federal government to pursue, maybe not the ambitious climate change legislation that was outlined in this current legislative session but some minimal

targets for appliance standards, building code standards, energy efficiency targets, renew -- some common renewable targets and get us all to agree to them. I think the Committee would have done some good in moving forward in advancing a debate that we now have been having for a number of years and we haven't really focused on who the real beneficiary is; and that's the retail customer.

MR. BOWEN: Yeah, I would -- actually, a lot of things that have been said here I think kind of in some cases fall into just a couple different categories that I would put into.

One is I would say that the comments that have been made around -- and I would agree even with Ralph, which is pretty rare, I think; but let's just go ahead and give it words, too.

I think there is no doubt -- and I think the EPA people have said this as well -- that we will -- that the system will react, and we can make the changes, and it's just unconscionable to

me that we would ever give up reliability in the face of an environmental change that we've -- we've seen that with the changes that have occurred over the last 20 years. I don't -- I don't think, as she said, there's -- I'm not sure I'm aware of any customer ever having lost the -- you know, the load or the reliability as a result of that change.

So, I would agree with that. Now the caveat I would put to that is that came at an expense. And I would say as an industrial, a lot of my industrial friends are not at the table anymore as a result of the expense that we have faced. And so a lot of that is no longer here in the United States as a result of it.

And so, I think the place I would take it to is the place of -- and this deals both with renewable as well. I think all of us are very much of akin or of a mind to make that effort to push the renewable side of it. I think maybe as he said the study work's been done. We've done a

lot of studies. You know, the notes are in. We're probably not going to add a lot of value to those notes at this point in time.

I think it's taking what we have in and putting it to use and giving it advice and counsel, if you will, to, let's say, the Department of EPA relative to what are the impacts associated with the changes that are being suggested.

And I think those are -- those are really important and an important role for DOE to make because DOE can -- can give advice as to what those changes mean. And that is not just in the adequacy but in where the generation's going to be if you make those kind of changes and where the generation's going to be if we make the renewable change, right?

One thing we know of is that the backbone of the country is going to move. I mean, it has to move to be able to accommodate renewables and the locations where they're at, getting it to the

load which is where it's at. And yeah, I think -- I think we've got to stay on point with that.

I think the -- I think the corridors issue has been out there. I think we would really be negligent in not addressing that again and just continuing to say whether it's the corridors as they were planned years ago or some different change that you guys can come up with. I don't really care.

What we do know is that it's not working or it's not going to work unless we make some changes. And whether there's an agency that does that or takes responsibility or what -- I don't really care. I just know that most of us that have been in the transmission business for a lot of years know that it's going to be very difficult to accommodate the direction of where we'd like to take this country if we don't make some fundamental changes.

So, the advice around both how you get renewable and how you deal with that into the

marketplace today and what changes are going to happen with that in the form of generation as well as where is the generation going to change and move to as a result of EPA's rules and regulations that they either promulgate or it comes out in the way of legislation.

Again, the infra -- as an example, the infrastructure needs around natural gas -- as we've talked about here today -- are very important. And I hate to say it. I -- I'm not seeing a lot of people work on that. And I think it is our role to say hey, look, as energy -- as Richard, you aptly put, this is an energy issue. Right? This is not just, you know, carbon or -- I mean, this is an energy issue and the effect of the energy complex for America and what you have to make in order to transition to where you're wanting to go relative to regulations -- CO_2 or otherwise.

I mean, we're not going to be able to accomplish that, and the advice that you would be

in a position to give would be one of, hey, that's great; go for it; but you must consider the implications of the following things in order to adjust to meet where you're trying to go. And that is natural gas infrastructure, natural gas reliability under a single contingent event much like we do in the electric transmission business because it's unlikely that if you took out a line, you would have ramifications, although we have seen that in the history of our transmission system. I think we have to think about the say way with nat gas.

Those of you guys who are in the northeast clearly know there's a very limited infrastructure up there. And if you took out Transco 6, guess what -- you've got a problem, folks.

And if we add a significant amount of capacity that's nat gas, that's a problem.

MR. COWART: Gordon never worries about that.

SPEAKER: Right.

MR. BOWEN: So, it's those kinds of things. I would guess I would just say transmission, infrastructure pieces to it. I think that's the advice.

MR. COWART: Thank you. Tom?

MR. SLOAN: Thank you. And I come at this, obviously, from a different perspective given my background.

I think it's important to sort of reiterate some of the things that -- points that have been made but on different perspectives.

Looking at transmission corridors, those that exist, those that were planned or we might need -- I mean, I'm sitting here cynically thinking politically you're not going to get any new corridors and that we might benefit the Department in the whole process by focusing on how do we convince policymakers to allow for a rebuilding on existing corridors, whether it's taller structures and DC lines and take out the

undergrowth -- I mean, underlying structures, whatever -- where can we bury; where can we do whatever.

Within that context, I mean, yesterday the Secretary talked about, you know, 50-year planning horizons. And that's -- that's appropriate. I think most of us would agree.

I look at it and say, okay, but we've got consumer rate issues. Public consumer advocates at least in my part of the country keep saying they don't want today's customers paying for tomorrow's, you know, infrastructure. I think we have to get beyond that.

But we also have the issue of cost recovery, as I think Lauren mentioned. We haven't mentioned return on investment. And, you know, to say we're going to have a 30-year cost recovery or 20 years, something like that, when the market's looking for 5 to 10, we've somehow got to reconcile those things. I mean, the consumer rates, the cost recovery, and the ROI

needs.

Beyond that something that I think that the Department might benefit folks like me is looking at how you promote regional or just state coordination among the generation and the transmission companies.

You know, RTOs do some of that, but in listening to the EPA presentation, I'm struck by the divergence even amongst this group over how we balance. If we're not going to do a cap and trade -- and I think Lauren said you wanted sort of a facility-by-facility approach. I would take a different perspective and say I'd rather do either a state or a regional approach.

In Kansas we've got IOUs who have obviously more money than the REC G and Ts who have more money than the Munis in order to try and comply.

So, is there a way that this group and the Department can get -- and I'll just say -- on a statewide basis so we can shut down old plants

and yet not have that municipality or that REC have to build a new plant, which they probably can't afford. So how do we move that forward?

I think an issue I raised earlier with EPA was when do we start looking at emissions from gas plants. How soon is that going to come in? What's that going to do to our planning.

And then my final point is as we look at CCS or - or, you know, increase SO_X and NO_X and other emission controls, we're increasing the station power needs. Would it help the Department if we sort of focused on how Smart Grid -- not at the customer end but on the T and D side -- can offset the loss of generation capacity that's available for customers? So we're looking at, you know, can Smart Grid in effect offset some of the power loss as we're using more station power.

Thank you.

MS. REDER: Yeah, I guess I just wanted to add the comment that I think we need to be

bold in our thinking and bold in our thinking in a couple ways.

You know, in many cases there's technology out there that's been deployed elsewhere. We maybe dabble in with it here -- and the same way with regulatory reform.

As you go around the world, a lot of things have been deployed. And I can't help but think so often we get stuck. And I'd like us as a group to kind of, you know, accept that the technology is there, accept that generally speaking we share a vision. I mean, there might be, you know, a little bit of nits and gnats on the edge that we may not agree on completely on the vision, but focus in on what presents us -- prevents us from getting from here to there.

And, you know, we've brought some examples up around in DOE working with EPA and trying to figure out maybe the division of responsibilities or process as it may be so that we can, you know, help each other out. But I

think it goes beyond that.

You know, I think, you know, certainly from the workforce front I've personally seen situations where, you know, Department of Labor and Department of Education can be partners in figuring out how we bring the workforce piece to bear successfully.

And, also, as I look around the table, I can't help but think that we can make a big difference in resolving how states work with the federal vision in order to facilitate the deployment. And I really hope as a group we take those things on.

And then the other point that I'd like to make is that we're moving into a systems of system kind of mentality where it's beyond kind of the traditional electricity scope or parameter that I've grown up with. And, you know, we need to look at the implications to transportation and think about the role in a much bigger sense than I think what a lot of us have grown up with. So,

I challenge us as a group to do that.

MR. COWART: I'm just going to -- are you okay to wait? I'm going to come all the way around. Let's keep going.

MR. WYNNE: Actually, that was a great segue into really the topic that I wanted to raise more for discussion than anything else, which is I -- I'm frequently not the smartest guy in the room. In this instance I'm coming from the transportation side, so I've been learning a great deal today and studying my materials to get up to speed on things that I've been, say, contiguous to for some time now.

The -- electric vehicles are vehicles generally that plug into the grid. I think it's fair to say in the context that we've been discussing -- the topics we've been discussing today are a double-edged sword.

And, you know, precisely to your point, if we look at it in a broader energy system, there are carbon gains that are -- tremendous

carbon gains that will be realized from plugging vehicles into the grid for lots of different applications. So -- but it complicates things if we're looking in a narrow way. Some of the metrics and some of the goals that we're looking at on the electricity side of this get buggered up pretty fast to say the least.

So, I just want to throw that out for discussion. And, you know, as a newbie here in this particular group but one that serves a growing number of leading utilities in the country that are trying to get out ahead of this, I think, phenomenal opportunity we're clearly at a watershed right now in addition to all the vehicle manufacturers, battery manufacturers, EVSE people, et cetera -- all those in the value chain that represent electric transportation.

I'm here to be a resource and -- but would very much like to invite some discussion on how we can -- how we can make certain that these intersections, this convergence at the risk of

using too many buzzwords gets -- you know, we get it right.

And, you know, it is a very, very critical moment in time, so let me just quickly add I'm really grateful to be here and glad to be associated with the kind of horsepower represented around the table. And I'm happy to -- I know we don't have a lot of time today, but I did want to put that out there for discussion.

And, you know, I am not looking for more work -- like any of you -- but I did note that electric transportation is not one of the topics listed here. I think it warrants to being on this list. And I do think that -- I mean, I'm open to the idea of hosting, or sharing, or convening a group within this group to try and understand exactly what the implications are.

Thank you.

MR. COWART: I'm guessing that many of us think that electric transportation is implicit in probably three of the -- three or more of the

categories listed here, whether it's storage, integrating renewable, dealing with demand growth, reliability. You know, if you think about it --

SPEAKER: Smart Grid.

MR. COWART: Smart Grid, right.

I mean, you are -- you shouldn't feel lonely at all.

MR. WYNNE: I didn't mean to suggest that I was feeling lonely.

(Laughter.)

MR. WYNNE: I'm trying to understand exactly all the different places this Hydra-headed animal gets into.

MR. COWART: Brad.

MR. ROBERTS: In our previous sessions with the Committee we kind of touched on it a little bit, but one of the things I think we need to look at is in Dave Kathan's chart on growth.

We kind of know what the load growth would look like if we didn't do anything. Then

we can kind of summarize what we think the load growth's going to be. We think we know -- we saw numbers in megawatts and gigawatts of wind power, solar power. We kind of know what the transmission system should look like if we built it out to bring all those -- all those renewable in. We've looked at all these Smart Grid applications. We saw some pretty dramatic stuff in his chart on energy efficiency and demand response if we fully deployed AMIs.

So, it seems to me on one page we should try to get what would all of those things cost if we wanted to do all of those things. If we want to add 250 gigawatts of wind, we want to add 50 - 70 gigawatts of PV, we want to implement all of the demand response and energy efficiency things, what would all that cost? If we want to add 80 gigawatts of storage, what would that cost? Instead of look like - okay, now if we do that, what impact does that have on the other things?

In other words, he showed on his chart

that if we implemented all of those energy efficiencies and demand response items, we could flatten the growth over the next, you know -- the controllable load would be flat.

Well, if we did that, all of a sudden the penetration of wind and solar would go up dramatically. So what is the impact, and what is the -- how do they relate to each other? Because we've got these pockets of information, and it seems like if we could kind of put it all in one place as a baseline to talk from, it would be helpful.

MR. COWART: I'm just thinking out loud here because that actually -- I know from trying to -- being part of a big study that tried to do that for -- quite recently for the European Union that there are so many interactions among all those things that actually answering your question would be a huge study.

But I'm guessing that you're not saying that. What you're saying is -- is there -- can

we refer to such work that's already going on and just try to draw from it and put in front of ourselves a scenario or a mix that would then guide our deliberations. Is that what I heard you say?

MR. ROBERTS: That's basically -- what I'm saying is basically look at -- if we deployed the -- what we would consider the proper amount of energy storage over the next 20 years, what would that cost. What's that relative to everything else? You might be surprised at what that number is, or we might be shocked at what that number is.

So, that was -- that was what I was trying to get at.

MR. COWART: Thank you. Barry?

MR. LAWSON: Thank you. Just a few quick hitting items here.

First, I think whatever work we undertake as this new EAC, we should take a look at the reports we did a couple years ago. I think there

was a lot of good work and a lot of good effort that came out of that. I think we should be careful not to duplicate that work. And in some cases there may be topics we want to take another look at that we did work on then but not -- let's not, you know, return exactly what we did before; but there was a lot of good work in there.

MR. COWART: So, one of the -- just as a take-away for staff to do this immediately, very soon the first thing you might get from us would be the last set of reports.

MR. LAWSON: And one thing -- and this is outside of really what I wanted to comment on, but if you can send us links to the reports, not -- and not the reports themselves -- some of the sizes, some of the files that have been sent around lately have been rather disabling to my inbox, and I don't know about others, but the more we can use links instead of attachments would be helpful.

MS WALLACE: So, if you go to

www.energy.oe.gov/eac, you can find the reports there.

MR. LAWSON: And I'm -- and I'm talking in general about any documents that are -- that you want to get to the EAC -- if possible, if they can be posted instead of sent around. But it may not be possible. I understand that.

MS. WALLACE: We are going to be developing a share point site --

MR. LAWSON: Oh, good.

MS. WALLACE: -- where people upload all materials, all background materials (Inaudible.) and any (Inaudible.) share point site. (Inaudible.) providing training.

MR. CAVANAGH: I've always (Inaudible.)

(Laughter.)

MR. LAWSON: I didn't want to get us sidetracked on administrative issues, but it was -- it was the right time to bring that up.

Anyways, a couple other items: Next, I am interested in working with Rob and others on

the DOE corridors issues and seeing what we can do there in a productive way. So whatever -- I hope we do have some focus on that in work with the EAC.

I would also say that we did focus a lot last time around on transmission siting. And it was difficult; it was challenging; and we didn't solve the world's problems. I don't think we will this time either.

However, I think we shouldn't ignore the issue. I think we could look to maybe do a quick-hitting type brief on the benefits of having the transmission that are needed for a lot of the goals and initiatives we talked about, and also the really negative impacts of not having transmission for a lot of the things we've been talking about.

That doesn't solve the siting issue, but it does -- I think we could put together a document that could highlight the impacts of not having that transmission built that is needed for

many of the things we've talked about today.

And finally, I just -- whatever products we have, I hope that the -- an overarching principle will be affordable and reliable electricity. I hope we'll see that leading off anything that we're talking about; and I think that's key for anything we're doing.

Thank you.

MR. COWART: Thank you. Well, let's keep going. Bob.

MR. CURRY: Okay. I am not only new to this committee; I'm new to advisory committees generally.

And a couple of base questions which no one needs to answer, but I think they infect what we're trying to focus on: Are we seeking to be incremental in our efforts to support issues before DOE, or are we trying to forge new tools to be deployed, or both?

What issues are most important to DOE and how can we as a committee best support them?

The depth of expertise and the range of interest around this table is truly significant. This is a big industry and a lot of this big industry has got some very significant players from every segment of it in the room. So we have a lot of talent to bring to bear.

I'd like to be somewheres near the lever that moves something around if I can be. That might or might not be a value added, but I'd certainly like to make it that way.

And, finally -- and I'm not saying these are exclusionary, one against the other. We may have different approaches and different -- the other thing that struck me, having been suffused with FERC in my experience as a state regulator, is echoing again what Ed Krapels said earlier, a lot of the issues that are being discussed here have a certain element at FERC. And perhaps Joe thinks all of them have a very significant element, but certainly many of them have significant elements at FERC.

And I think we need to consider how best within the -- the various ways and means of Washington we can enlist some of the efforts that have already been undertaken and lots of time spent on certainly by our staff. We probably have five or six people at the New York Commission that spend almost their entire existence dealing with FERC. How can we best manage and marry those two different approaches, different jurisdictions, et cetera?

MR. COWART: Mr. Bartels.

MR. BARTELS: You're not going near my first name again. And I will keep it short.

So, I think from the previous EAC what I know, Pat, is that when we did the reports, then after the reports it went quiet, right? My comment really request would really be for this to be an ongoing thing during its term.

The other thing is, (Inaudible.), you made the comment about we all kind of agree on the vision. I -- I am not sure whether I agree

with that. I think we often pretend that we all agree, but I think if you wake everybody up at 2:00 o'clock at night and say what are the top priorities, we all give a slightly different answer. So I think if this group could come out with, let's say, almost like a one-page where we say we do all agree on this one, two, three, four, five, I think that would be extremely powerful.

My feeling is that the less we execute as a country, the more non-governmental organizations (NGOs) we create. I learned some new NGOs today and wrote them down. And we have even more difficulty in reaching consensus. So, I would really want to emphasize a point about a common view on what the top priorities are.

MR. COWART: Fred's been waiting. And then I'm -- just to change the pattern, go down to Sonny who has been waiting a long time and come up the row. Fred.

MR. BUTLER: I've been listening to this

discussion, and it occurs to me that there is some -- an issue that we probably have not covered het, and it's something that's always -- it's been important to me for a while, and so I'm going to voice it.

When I thought about what an advisory committee to the Department of Energy could provide to them, it was more along the lines -- and maybe I was wrong -- of advice as to how they ought to proceed in this area that we're talking about as the national Department of Energy. I mean, they've got a bully pulpit. They've got access to an even bully-er pulpit down there on Pennsylvania Avenue at 1600 if he so decides to take up that challenge.

And we have a major education issue -- a problem, challenge -- ahead of us. I mean, I agree with Lisa Crutchfield that some of these things that we talk about are in the best interest of the customers.

The problem is the customers don't know

it yet. They won't agree, and Guido's right that you don't -- we don't all agree. Why would we believe that the customers out there would all agree on how much they're willing to pay for renewables, whether renewables are a good idea. Is this Smart Grid concept something that they're willing to embrace and help pay for?

So, I think part of what we need to consider here is suggestions to the Department as to how they might go out and help eliminate some of the obstacles towards achieving some of the goals that this group as a group -- and it doesn't have to be unanimous because I don't think we'd ever get unanimity -- might think is the direction the Department ought to move in and then help come up with some ideas maybe on dealing with some of those obstacles.

MR. COWART: Sonny.

MR. POPOWSKY: Thanks. I'm not quite sure how -- quite to articulate this, but there's another group out there that's talking about

these issues -- the ones we see on TV on the news shows every night. And our conversation that we're having here is so far different from the conversation that's going on in the -- in the Capital P political world. It's very -- to me, it's very depressing that cap and trade has become a derogatory term. It's a term that is spat -- it is spat at in the evenings. And my concern is that we -- we at least have to take into account the fact that we may not be living in a carbon constrained world anytime soon in this country; and my fear is that -- is that the assumptions of at least people like me have been -- have had for all these years that we were moving in that direction may not occur.

And all I'm suggesting is that we have to have a parallel track -- a no-regrets track that the kind of things that we're doing will be relevant in the world in which we're living.

And, you know, the obvious thing, Rich, of course, is energy efficiency, which is, you

know, the classic no-regrets policy; but there are other things that we're talking about here that I think will be helpful in a carbon-constrained world, but also in a -- in a world -- in a business-as-usual world. So, I just want to keep that parallel track in mind.

MR. MASIELLO: We don't have, I don't think, the distributed generation community, especially a solar representative at the table. And that led me to want to throw two things out.

First, we've really focused a lot on renewable in the context of wind and what it means to the transmission planning and operations integration. But working with utilities that are seeing a high penetration of roof-top solar, their problems are real and here today. And not enough attention's being paid to the integration of DG into the distribution system or into the wholesale markets.

And the Smart Grid deployments, for instance, kind of ignore it. People put AMI on

the side of the house, but the meter can't talk to the panels.

And that leads to the second point. Our industry's had this artificial -- or maybe not so artificial division, segmentation into generation, transmission, distribution. And as we deregulated, we had a segmentation wholesale, retail.

Smart Grid and the internet and DG, though, have let the genie out of the bottle. And we're going to see a blurring and a convergence of wholesale and retail and of distribution transmission. None of our planning tools, none of our operational tools, none of our market structures really have been designed when there's very high penetration of DG and DR. And we can't think about things in this -- in these buckets anymore.

MR. COWART: I just want to say thanks for blowing up my head. No, no, just --

MR. MASIELLO: That's such a challenging

thought that -— that all of the conversations we‘ve been having about distribution this, or transmission that, or whatever, you know, you’re saying, well, we ought to be thinking about it, you know, a totally different way.

MR. CAVANAGH: Don’t just let him blow it up. Make him put it back together again.

Sorry, I didn’t mean (Inaudible.) -

MR. COWART: I’m just making light of the challenge. Michael.

MR. HEYECK: I’m okay in participating in the corridor thing. No question there.

One thing on your originating slides of this day you talked about resiliency. And if our roads are arteries and veins, the electric grid is the nervous system of the country’s economy. So, national security -- I know we have committees going right now dealing with high impact, low frequency events and so on; but there is a point you reach where what does the Department of Defense pay for; what does

Department of Homeland Security pay for; what does -- which is a taxpayer side -- versus what does the customer pay for? So we need to coordinate with the Department of Homeland Security and the Department of Defense and try to figure out -- I want to augment -- I don't want to replace the committees that already in place but stockpiling transformers -- actually, getting transformer manufacturing back in the States would probably be the greatest coup, rather than stockpiling transformers from outside the United States.

MR. COWART: Peggy reminds me, excuse me -- that at 2:30 we are publicly noticed for a period of public comment. And -- I'm sorry?

(Inaudible.)

MR. COWART: And then -- so we can continue this perhaps in a few minutes; but we do have one person, Joe Watson, the Director of Exelon, who wants to make a comment.

And our practice is to keep the comments

to five minutes or less.

(Inaudible.)

MR. COWART: Okay. Can you go to a mike?

MR. WATSON: Thanks a lot. I'm Joe Watson with Exelon Corporation, and I really have enjoyed watching the function today and in particular, was very interested in the comments on emissions earlier this morning.

And one thing struck me in particular. I think former commissioner Kelliher had a question about kind of like the EAC's interaction with DOE and in turn that interaction with EPA. And I guess the question that I had relates to a recent announcement that Chairman Wellinghoff, the FERC chairman, made regarding putting together something along the lines of an interagency task force to kind of take a look at the impact of the expected emissions regulations on the electricity sector.

And I was wondering how DOE -- this is directed to the DOE folks -- how DOE foresees

their interactions with EPA with respect to this. Do they anticipate doing it through interagency function, or do they perceive doing it through perhaps a more direct bilateral relationship?

MS. HOFFMAN: We'll probably end up doing a little bit of both, but we'll have an interagency -- most likely have an interagency group on it.

MR. COWART: That's it? Thank you very much.

All right. Yes.

MR. CAVANAGH: That leads the -- your suggestion earlier was to try to find a way to -- a process that connected DOE and EPA. The suggestion that FERC is also relevant, particularly on a resource adequacy question, does seem to flow naturally from that comment.

Perhaps you --

MR. COWART: Yes.

MR. CAVANAGH: -- as a friendly amendment.

MR. COWART: Yes, that's right. I take it as a friendly amendment, and I guess one thing that I will be asking members of the Committee: Are there those -- we'll be send -- I'll send out an e-mail on this, but are those who would want to participate in a small working group to actually advance that idea.

We were being delicate about FERC in this instance because FERC quite naturally wants to reserve to itself its, you know, jurisdictional separateness and its -- you know, its quasi judicial independence, and that's something that I appreciate, of course, and want to support.

But they may very well want to coordinate in a way in developing a process that would -- doesn't waive anybody's quasi judicial independence.

MR. CAVANAGH: And EPA's quasi judicial independence is probably at least as sensitively regarded.

SPEAKER: That's right.

MR COWART: Yeah, it's a very good point.

So I think that -- (Inaudible.) -- you know, right after this meeting, or right now, or in response to an e-mail if you'd like to join me in advancing that idea, let me know.

(Inaudible.) -- people who were ready to speak. Roger.

MR. DUNCAN: Just two points: I wanted to pick up on what Ralph was saying earlier and blurred the distinction on a little further in some of our conversations because we talk about generators, transmission distribution, and wholesale and retail, and so forth.

Smart Grid is -- and distributed generation is blurring not only that but is significantly blurring what we consider to be utilities and customers.

And also in energy for the last couple of years I've been talking to our staff about starting to talk about prosumers. And prosumers is Alvin Toffler's term that he came out and

which combined producer and consumer into one term and -- whereas utilities are starting to lose customers rooftop by rooftop. We're starting to gain prosumers rooftop by rooftop.

And it's more than educating the customers on the issues that we're involved with. It's educating the customers and training them as partners in this whole new electrical grid.

And it changes a lot of the issues that we're talking about -- both in terms of reliability and, as you pointed out earlier, you know, there may be times that demand response -- the equation changes.

And Smart Grid --I see all these numbers about efficiency and so forth that can be achieved, and I want to see the studies after they've had the in-home display for six or nine months. The numbers change quite a bit. And so it's much more complicated, I think, than we've been led to believe.

The second issue I wanted to raise is --

as I listen, all the issues and the work plate that we've laid out for ourselves becomes more and more important to me that I wonder where our priorities are.

And I don't have a suggestion for where they are, but I guess I would feel comfortable if, as the Committee as a whole, we went through some sort of process or discussion to look at where the priorities are. What's the 80-20 rule here? Where do we have the most impact with our time and effort? Because we've got lots and lots of things we could be doing, and I'm not sure yet in my own mind which ones will have the most impact as opposed to just lots of work that may not be that meaningful.

And that gets to the question back to DOE and -- and since I've retired, I find that I am on several advisory boards. And the really good ones have had whoever we're supposed to be advising come to us with specific questions, as you mentioned earlier, Richard.

And in my mind it's not just questions, but what are your priorities. What's keeping you up at 3:00 a.m. in the morning, and is it anything that we could significantly help with.

So those are my two thoughts.

MR. COWART: In reaction -- I mean, in response to that, I -- as I said earlier, I think what I'd like to do is collect subcommittee chairs, Lauren, and myself, and sit down with the DOE folks here and try to answer your question and then give -- and having listened to everything that you-all have said, try to put in front of you a work plan that - at least the beginnings of a work plan because, as somebody said earlier, this committee's going to be in existence for at least two years. It's a three-year term, but --

SPEAKER: It's a two-year term.

MR. COWART: It's a two-year term.

And so we've got, you know, the opportunity -- it would be smart for us not to

commit all of our time now because things are going to come up.

But what we'd like to do is lay out at least some initial tasks that we would like you-all to participate in answering.

Do you have anything you want (Inaudible.) --

MS. HOFFMAN: Well, I just have one comment.

I think it's very good input that we will, for the next meeting, develop a set of questions and some priorities that we would ask the Committee to respond back to us on. So I think that it will be a must for the next meeting.

One of the things -- I mean, you asked a general question of what keeps me up at night. And I guess I'll say several things. Probably sometimes maybe the question may be what frustrates me most.

I'll go from a point that we've done

congestion studies in 2006 and 2009. And what have we done to resolve some of the congestion in the United States with respect to solution sets and then dealing with the corridor issue kind of frustration.

Some things that I think we have made progress on was going back to the 2003 blackout. It took us -- it took the Department a very long time to actually go through and analyze what was happening on the system as a result of the 2003 blackout. And I think we need to have more capabilities to be able to respond faster from that perspective.

So, going to the resiliency issue is do we have a strategy to build more resiliency for the electric sector. Do we have a game plan?

Getting to the heart of the issues on the transformer -- it's really getting to the heart of the issues with respect to stockpiling versus manufacturing, getting and asking folks to order more transformers that are coming from overseas

just so prices can go up and -- are we really building the platform that we need for the future.

So, what do I want from this Committee? Near term, probably actions that we should look at but also what is the platforms that we should be building that'll lay the foundation for moving things forward.

Another thing that -- that I struggle with dealing with is really some of the business models in the United States for utilities and where we're heading. And, you know, it goes back to the deregulated verse -- regulated versus unregulated. I mean, we have a -- definitely a mix of things out there. Is there a way to provide certainty with some of that mixes that are going on? And I go back to, also, driving certainty.

Some of the comments earlier, which is a message we'll take back, is sometimes I don't think DOE does put enough emphasis on cost and

cost impact in some of the things we're doing. And so that's something that I'll go back and make sure that we look at.

Another comment is how are we building ecosystems around -- one of the discussion points is the whole ecosystem, say, around the buildings' environment as we look at Smart Grid, as we look at just the ecosystem around energy efficiency, demand response, building technologies, and saying are we building the right ecosystem for that.

You could do the same thing with respect to transportation in the United States in looking at that ecosystem.

We talked about congestion, talked about business models, talked about -- one thing that I'm kind of concerned about as we move forward, but some of the things, is talk about least cost solutions. As we look at it, how are we going to deal -- sometimes we look at what is the fair market value, but I worry, are we driving costs

up versus promoting these cost solutions. So that's something to think about as we continue to have a conversation.

The infrastructure with respect to the right of ways and building new poles and platforms -- if we could come up with a way of recommendation on looking at solutions on some of those issues, I think that would be very important.

So, those are some of the things as I was sitting here looking at and some of the things that came to mind as we move forward as a committee.

MR. COWART: One thing I didn't want to pass up is the question from the Department and the presentation this morning about the big NREL heavy renewable study that we heard reports on this morning. We -- there were people here who perhaps are interested in being peer reviewers in the near term of that study. And so, we need to collect names of anybody who would like to be

sent the study and have a chance to look at it.

So, should I -- just raise your hand or --

MS. AZAR: Do we have to comment on it, or can we just look at it?

MR. COWART: Actually, he did not extract a promise. I was waiting for him to say if I send it to you, you must comment. He didn't say that.

SPEAKER: If that's the case --

(Laughter.)

SPEAKER: Why don't we look at it and tell him not to send the comment --

MR. COWART: Yeah, that's true.

(Inaudible.)

MS. WALLACE: Who raised their hands?

MR. COWART: Lauren, Fred, Mike, Roger, and myself.

All right. Thank you.

MS. HOFFMAN: Actually, if there is one other thing that we should keep in mind is for

future meetings is Metrics for Success as we look at it going back to -- as I think about the Smart Grid report, and the Smart Grid System study is really taking a hard look at some of our Metrics for Success and showing progress.

And I think we should -- we could probably do that in many different aspects of our discussions.

(Inaudible.)

MS. HOFFMAN: Metrics.

SPEAKER: Use the microphone.

MS. HOFFMAN: He asked metrics for the nation or metrics for this committee. I'm talking about metrics to show progress.

And so, if it's building transmission or it's Smart Grid.

MR. ROBERTS: I think that our reports that we did -- I think we were mandated to do updates every two years -- as a committee, I think -- if I remember.

MR. MEYER: We will have to dig out the

text and circulate the text with respect to both subcommittees so that you'll have a clear sense of what your marching orders are.

MR. ROBERTS: Seems like we were required to do an update.

MR. COWART: Are there further comments before we adjourn? I'm conscious that we're close to adjournment time. I said we'd adjourn by 3:00, and I'm not going to prolong the conversation just to stay until 3:00.

Let me say I'm not seeing any hands go up, so that -- let me say in closing then that it's great to spend a day with you-all, and I'm looking forward to more. And I think you're going to -- we will convene and kind of report back to you-all on what we've heard and what ideas the Department is putting in front of us.

And we're going to be recruiting you. We got good sign-up for both of the subcommittees. We will be recruiting you for perhaps some other work teams as well.

And then -- and we're also going to circulate to you e-mail and phone numbers of everybody on this committee.

Anyway, let me just say thank you very much for being here, and I'm - I'm prepared to say goodbye and thank you very much; and I hope to see you again soon.

(Whereupon, at 2:49 p.m., the Electricity Advisory Committee Meeting was adjourned.]

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