Electricity Advisory Committee Meeting

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March 10, 2011

National Rural Electric Cooperative
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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, Retired
Salmon Ventures Ltd. and
New Jersey Board of Public Utilities (Ret.)

The Honorable Robert Curry
New York State Public Service Commission

José Delgado, Retired
American Transmission Company (Ret.)

Robert Gramlich
American Wind Energy Association

The Honorable Dian Grueneich
Morrison & Foerster
California Public Utilities Commission

Michael Heyeck
American Electric Power

Joseph Kelliher
NextEra Energy, Inc.

Edward Krapels
Anbaric Holdings

Ralph Masiello
KEMA

David Mohre (Representing EAC Member Barry Lawson)
National Rural Electric Cooperative Association

David Nevius
North American Electric Reliability Corporation

ELECTRICITY ADVISORY MEMBERS PRESENT:
(Continued)

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

Gordon van Welie
Independent System Operator of New England

Mike Weedall
Bonneville Energy Administration

Brian Wynne
Electric Drive Transportation Association

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Office of Electricity Delivery and Energy Reliability

David Meyer
Office of Electricity Delivery and Energy Reliability

John Schnagl
Office of Electricity Delivery and Energy Reliability

Larry Mansueti
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Kerry Cheung
DOE, AAAS Fellow

Caitlin Callaghan
DOE, AAAS Fellow

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Cami Dodge

Natalie Kempkey

Katie Shay

PUBLIC ATTENDEES:

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Redland Energy Group

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EEI

Larry Camm
Schweitzer Bergier

Charlotte Schidemore
(No Affiliation Disclosed)

Matt Hourihem
ITIF

PRESS ATTENDEE:

Jason Fordney
Platts

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P R O C E E D I N G S

MS. WELSH: For those of you who want access to the Wi-Fi, the network is cc1, all lower case. And the password is nreca4301 for those who want Wi-Fi access, network cc1, password nreca, all lower case, 4301, no space in between.

MS. HOFFMAN: Good morning.

MR. AZAR: Good morning.

MS. HOFFMAN: Welcome to the Advisory Committee meeting. I'd like to thank everybody for coming out here today. I'd like to thank our hosts. It's wonderful that we're able to meet at this location, and it's also wonderful that you-all have spent your time to come out here and participate in our Advisory Committee meeting.

We have a lot of important topics. I think we'll continue to have important topics. There is a lot of things that are open for discussion and debate so that we'll hear about some of those things today.

We have a special guest speaker, Dr.

Koonin, who's going to come in and give some insights on his thoughts with respect to the Department of Energy Advisory Committees and where he sees some things going, some challenges, opportunities. So I look forward to hearing from him.

And what I'd like to do is before I turn it over to Rich, is just especially once again extend my thank you to all of you. I really appreciate and value the advice and the discussions that occur in this committee. And I want to encourage that we continue to do more of that.

It's -- if anything we've learned from the Electricity Forum and other debates, I think the constructive discussion is very good for the industry for the community in actually moving things forward. It gets things out on the table. It allows us to debate topics. It allows us to work in a forum that's quite transparent and open for -- for the ability to come to some resolution or at least recognize that there is difference of

opinions. And I think that's valuable. I think that's extremely valuable especially in this time where we're moving forward and trying a lot of new technologies. We're trying some new concepts. We're trying new strategies especially in the sector. And I think we need to continue to vet that. A lot of things that we're learning with respect to energy storage we'll talk about today and how you value energy storage, how you look at energy storage and the role it plays on the system.

So, I thank you all for coming, and I look forward to a great discussion today.

Rich?

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

I guess I also would echo what you -- what you just heard from Pat in both -- in terms of thanking our hosts and in terms of thanking you-all because I know it's a significant contribution that you're making to the Committee, to the Department, and ultimately to the nation

by providing your expertise to this committee, and, therefore, the Department.

It's normal for us to begin by just going around the room and letting everybody quickly introduce him or herself. And so, if you don't mind, we can just start down at that end then.

MR. MOHRE: Okay. I'm David Mohre. I'm with NRECA.

MR. MASIELLO: Ralph Masiello, KEMA.

MR. KRAPELS: Ed Krapels, Anbaric.

MR. KELLIHER: Joe Kelliher, NextEra Energy.

MR. HEYECK: Mike Heyeck, American Electric Power.

MS. GRUENEICH: Dian Grueneich, recently Commissioner of the California Public Utilities Commission and literally, just as of now, partner with the law firm Morrison and Foerster.

MR. DELGADO: (Unintelligible) former President -- retired President of American Transmission Company.

MR. CURRY: Bob Curry from the New York

PAC -- PSC, whatever it is.

MR. BUTLER: Fred Butler, formerly with the BPU in New Jersey, and now retired and consulting.

MR. BOWEN: Rick Bowen with Alcoa.

MR. BARTELS: Guido Bartels, IBM and the Gridwise Alliance.

MR. MEYER: David Meyer, Office of Electricity, DOE.

MR. COWART: I'm Richard Cowart from RAP.

MS. HOFFMAN: Pat Hoffman, DOE.

MS. AZAR: Lauren Azar, Wisconsin Public Service Commission.

MR. WEEDALL: Mike Weedall, Bonneville Power.

MR. van WELIE: Gordon van Welie, ISO of New England.

MR. SLOAN: Tom Sloan, State Legislator in Kansas.

MR. ROBERTS: Brad Roberts, here in my role as the Executive Director of the Electricity Storage Association.

MS. REDER: Wanda Reder, S and C Electric Company and IEEE Power and Energy Society.

MR. POPOWSKY: Sonny Popowsky. I'm Consumer Advocate of Pennsylvania.

MR. NEVIUS: Dave Nevius, North American Electric Reliability Corporation.

MR. COWART: That's right. And, Richard?

MR. VAGUE: Richard Vague, Energy Plus.

MR. COWART: All right. Thank you.

We have a couple of guests in the audience. If you don't mind introducing yourself?

(Members of the audience introduce themselves.)

MR. COWART: Thank you. Well, thank you very much.

I expect that today's meeting is going to be different from most of our meetings in that this is really a -- a planning and working meeting more than it is a -- an opportunity to hear major presentations and then react to them, develop plans for advising the Department in

response to them. But what we've realized that we really need to do as a Committee is -- is plan a series of activities that for the next year, for this -- for the year 2011 -- will allow us to produce the kind of assistance that the Department is really asking for. And so it's terrific that Pat Hoffman is here with us today to make sure that -- the kind of assistance the Department is asking for is -- is made clear to us and that we have the opportunity to really respond to that and to put some ideas on the table that we think we want to work on over the next eight months or so.

I would expect that in future meetings we would have the opportunity to bear down in more detail on -- in response to substantive presentations from the Department, from the labs, from others in the industry. That's not what we're doing today. Today it's a discussion among ourselves for the most part. I mean, there are a couple of presentations, but it's mostly us trying to engage as best we can to develop our

work plans.

So, just with that general thought in mind let me encourage everybody to be quite willing to chime in and discuss in a thoughtful way the -- what you think we should be doing, what ideas you would like to put on the table so that we are able to develop that work plan.

After this meeting the Committee leadership, the Subcommittee Chairs, and the Department will meet and then try to sketch out something much more concrete for each of the Subcommittees.

I think that's all the prelude that I wanted to get into at the moment. We first have a report from the Energy Storage Technology Subcommittee. And Ralph is prepared to do that.

MR. MASIELLO: Good. And I have no Powerpoints. You should have two documents in your packet. One is a draft set of policy questions for DOE to consider. And I'd like to take some time with that and have some discussion. And the other is a report on storage

activities in the United States that Brad Roberts put together for us that's both a compilation of private industry efforts and also a high-level summary of DOE ARPA-E programs which we took the liberty to put together.

So, please find the policy document. Let me summarize it, and then let's have some discussion. The document's short, but it -- actually quite a bit of effort from the eight or nine people on the Subcommittee went into it to refine it to this point.

So the first bullet seems strange in the aftermath of all the Stimulus money that's gone into storage projects when it says, "Assist in shouldering the costs and risks," but the group felt that on the wholesale side things are happening with storage. For profit companies are making investments, proposing projects, bringing storage forth as an alternative in different capacity RFPs and the like, but on the distribution side there's a real risk of loss of momentum. The distribution demonstration

projects are one auths, and there's a feeling that state commissions will have a tough time allowing rate recovery on distribution storage going forward absent some push and momentum. So that's the first bullet.

And then the second bullet is really a follow-on to that. The -- as I said, the wholesale side's full of profit driven innovation right now. And subject of a lot of activity with storage around renewable integration in particular.

On the distribution side there's a murky set of policy issues, technology issues, rate recovery issues, and it's much more difficult to quantify the value of storage convincingly to a utility executive or a regulator that has to say it's a prudent investment. So we think -- we're suggesting that work on the costs and benefits of distributed storage is an area for work.

The third bullet follows this theme a little bit more. We class assets in the industry today as generation, transmission, or a

distribution. Storage doesn't fit neatly in any of those categories. And there are already real world examples.

And, Mike, forgive me if I misstate it, but I -- but we noted that with the Presidio Substation Storage, for instance, there were questions raised that said it's a transmission asset yet the energy goes in at one price and comes out at another, which the Texas Commission decided to move past, correct? But we saw that as the tip of the iceberg.

And a great example is if it's on the distribution system, it's a regulated asset, but yet there's a time arbitrage in the energy. How is that managed? And if the storage is used as a distributed provider of ancillary services, again, how do you bridge the unregulated regulated gap?

An even better question is technically there's not much difference between storage on the low voltage side of the distribution feeder and storage in somebody's back yard, but there's

a world of difference in how it's treated from a regulatory and financial perspective. So there's some guidance needed.

And I don't know that I want to characterize it quite this way, but there was a sense that FERC needs some better information than they get through the adversarial processes.

Okay. And then related to that and both wholesale and distribution we need a better definition of what are the products that storage provides. There's been plenty of activity where the storage developers have tried to force product definitions that fit the technology as opposed to what the interconnection markets or the system needs. And this probably is getting things backward, but it's the way the process works today.

We have great examples right now where four or five of the ISOs have got variations on the theme of how you define a new regulation product that can take advantage of the storage. And the experimentation is good because out of

this will come lessons about what the right product definition is. But in general, this is an area for work.

So those are the four bullets. I'd like to ask some of the members that put quite a bit of effort into this to comment on it, beginning maybe with Gordon if I could ask you to comment.

MR. van WELIE: I guess my point really was the last point that you made which is I think storage is a very valuable technology. It application on the grid, I think, is evolving, and we need to be careful not to try and sort of drive the wholesale market design to accommodate a specific technology because we're not sure today what the most cost effective technologies of tomorrow will be. So the correct starting point in my mind is to be clear about the definition of the various services that are required in order to keep the grid reliable.

I think we're in a phase -- the next evolutionary phase I think in terms of the evolution of wholesale markets where we're

starting to unpack what was previously a fairly coarse definition of those various wholesale market services required to keep the grid reliable, but the starting point needs to be what do you need to keep the grid reliable. And then you run the competitive market to procure the least cost service.

And whether that comes from storage, whether that comes from something else, the grid operator really ought to be neutral to that. And so the one concern that I had expressed on the call was that we need to be careful and the industry needs to be careful that we don't come up with a solution looking for a problem to solve.

The other thing that I also mentioned to -- I think it was Ralph and Rich as well -- which is kind of an interesting finding. We did a report on large-scale wind integration in New England. And one would think that large-scale wind integration would create an economic opportunity for storage, but our simulations

actually show the reverse, which is an interesting sort of counter intuitive result.

And the reason for that is that there's a price spread between daytime prices and nighttime prices, typically because the load's higher in the day than it is in the night, and you're running more expensive units in the day relative to the night.

The minute you put a lot of wind onto the system, you compress that price differential. So you actually greatly reduce the economic arbitrage opportunity for wholesale storage. And so I think it's going to be harder to build storage, not easier, when it comes to sort of classic storage in terms of shifting energy from on peak to -- from off peak to on peak.

I think there may be a better economic case for fast regulation services and the like where essentially you're actually allowing somebody to tap into the regulation market or the reserve market if those storage devices can meet the operating requirements in those markets.

But it does make me wonder a little bit about as we connect up a lot of wind, how is the economic case going to be made for large-scale energy storage?

MS. HOFFMAN: One of the things we need to keep in mind as we look at that is actually the characteristics of the wind and how much wind is on the system, whether you look at BPA's region versus New England versus ERCOT and some of the wind of basically the capacity and when it's coming on.

MR. DELGADO: May I ask a question? I have a question for you, Gordon.

Can you please explain because I have to tell you, you really blew one concept away which is what is driving the night prices up? What is the mechanism by doing that? You said the gap, the arbitrage gap, is coming down. And my expectation is when you have too much generation at night, the price will come to the bottom.

MR. van WELIE: That's correct, but you're also putting -- the wind doesn't stop

blowing during the day. So let's take a system, particularly the northeast systems that are -- and Texas would be the same way where the marginal unit is gas. So the wholesale carrying price is 90 percent of the time is set by natural gas.

So when you put a lot of wind on the system, what you're going to be doing is marking those marginal units off the margin. So you'll be taking some of the least efficient gas units and you'll be displacing them with wind. So what will happen during the day is you're price will come down during the day relative to where it was if you didn't have wind on the system, which is a good thing from a pricing point of view, but it's going to -- if you're a -- let's say you're a pump storage scheme. And your opportunity is to basically pump at night when the prices are low and then inject energy during the day when the prices are high.

The arbitrage opportunity in all the modeling we did -- and we looked at putting a

large amount of wind on the New England system -- that gap closes. And so the amount of revenue there to pay for the capital investment of a storage device actually goes down.

MR. DELGADO: As a follow-up, that is very locational specific because the winds in the Midwest during the day basically are not commercially very viable. In other words, we do have a very significant difference day to night that we can see it in the meter. You know, we have much more wind at night than we do during the day.

So apparently in New England because you have the coast, you're likely to have a different wind regime. Okay. So if -- in a regime like yours I can see that and I appreciate that. Thank you.

MR. van WELIE: I guess what you'd have to look at is we did a model, a mezzo scale model, right across the New England area to model wind speeds. And what you'd have to look at is that mezzo scale model relative to the mezzo

scale model of the Midwest and see if there are significant differences.

But it wasn't the result that I was expecting. Okay. So I was expecting the opposite which was a greater economic opportunity for storage. And what we got was the inverse.

(Mr. Cowart recognizes and yields the floor to Mr. Butler.)

MR. BUTLER: Yeah, I just wanted to clarify. And it's too bad that Rob Gramlich is not here from AWEA, but what you're saying is that the fact that the wind on the system depresses the daytime rate is bad for storage. It's not a detriment to pricing and reasonable pricing, but it's a problem for storage.

And José's point is that may not be the same everywhere in the country because that differential doesn't exist perhaps as much in the Midwest as it does in New England.

MR. COWART: Let's just go around for those who have their cards up.

MR. HEYECK: I just wanted to explain the

Texas situation to give you an example of -- to give you the idea of what it is.

Presidio, Texas, is a border town. It's about a 6 megawatt border town, and we put in a 4 megawatt NAS battery. And the justification for that was to defer about somewhere in the neighborhood of $50 million worth of transmission development for a number of years. And that was the justification for it.

I believe the Texas Commission considers the charging and discharging really in the noise, in the losses of the marketplace. So it was not justified based on the economics of the energy market. It was based on the economics of deferring.

We also have a number of applications at AEP which has deferred distribution assets. And again, those are not based on the energy side of the equation but more on the upgrading a transformer or a substation.

I'd just like to be careful. I think the greatest focus ought to be on the technology and

getting the prices down. Obviously a circular volume gets the price down as well, but that should be the focus.

How to classify it, I think it's too early in the game. If we start classifying it and putting it in buckets, then you may disincent the volume that may be out there for other applications beside playing in the energy market. Thank you.

MR. COWART: Ralph.

MR. MASIELLO: Coming back to Gordon's discussion, that information needs to get out to the storage community because I would guess, Gordon, there are days in your simulations when the wind doesn't blow and the price spread would still be quite high, but it says the storage developer has arbitrage only a few days a year, right? Which means the different technologies are going to be favored based on the capital cost versus the life expectancy of the technology in terms of the number of cycles you can get.

So that -- you know, that outcome would

shift the developer's perception about what the right parameters of the technology are as well.

MR. van WELIE: I'd be happy if the Committee is interested to circulate the study we did. We contracted with GE and EnerNex. So they're both brand name entities who have done work in all of the other regions around the country. And they did a very detailed -- it was a million dollar study, so we spent a lot of money on this.

And I raised the question only because there's a lot of talk in the industry about sort of massive ramp up in storage, so people are getting really excited about it. But I -- when I saw that result, I wondered, are you going to be left with sort of niche applications like Mike is referring to, which is you can -- if you can defer a transmission line for a while, you get something there.

I think the regulation market is a niche application as well. So I wondered to myself about the economic case for storage under those

circumstances.

And part of the problem is I think wind, on its own, struggles to be competitive with low gas prices at the moment. So once you have -- once you spend the money to interconnect large-scale wind basically by making the transmission investment, you're essentially injecting a subsidized resource into the wholesale markets anyway.

And then you want to take advantage of that and put some storage on, and you're sort of in the cycle of as you -- as you distort the wholesale -- the economic price in the wholesale market, it makes it harder to make the economic cases for other devices that you want as well.

So I'm not sure what the answer is to all of that, but it did sort of open my eyes when I looked at that and thought, well, we all want -- as grid operators, we all want more storage, but storage has to live on that arbitrage opportunity.

And, you know, if the Committee's

interested, I'll just circulate -- I'll send it to Rich, and you can circulate it to the rest of the Committee.

MR. ROBERTS: It's Brad. Yeah, that would be great if you could -- if you could do that.

One question, Gordon, in that study what percentage of the wind was offshore?

MR. van WELIE: Actually we modeled all kinds of different scenarios there. The directional results were comparable, so we looked at the bulk of the wind coming from onshore, the bulk of the wind coming from offshore, a mix of wind. So we did very extensive scenario analysis on many different scenarios.

I mean, the good news was there's lots of wind so we can actually -- if we needed to meet our renewable energy requirements through wind integration, we can do it. There's a big transmission cost. And in this other result which I found counter intuitive.

MR. ROBERTS: Okay. Because obviously

offshore wind is extremely expensive, the premium for that, which may blow more during the day potentially offshore, but that's -- the price goes up substantially.

MR. van WELIE: Yeah, I -- to be honest with you, my instinct is that the onshore wind profile in northern New England isn't a great deal different than other onshore wind profiles.

So, what -- to answer the question that José raised, you would have to look at the assumptions in the mezzo scale modeling exercise on wind distribution in New England versus other areas to see whether what we found in New England would hold in other areas.

MR. ROBERTS: Well, in general as you go farther north there is more wind typically during the day than the -- what you run into in the Midwest and the Southwest where it's mainly nighttime, not asset, but that report would be good if we could see that.

MR. COWART: (Inaudible).

MS. AZAR: A couple things. With regards

to the regulatory aspects of things, I think that the point that we really need to be focusing on the technology is absolutely on the mark, but the regulations can't get in the way.

And so right now I think regulators don't know how to deal with storage, and we need to make sure that essentially the -- any barriers that are created are eliminated so that we can let this play out to see where the best opportunity is.

Also, I just wanted to comment on Gordon's note that arbitrage is what's going to be driving storage. And I'm not sure I agree with that, that there may be -- depending on where we end up with how we're going to be using this technology, the arbitrage opportunity may not be the only thing that's driving that.

MS. HOFFMAN: So, the one thing that I guess I would ask or question is how many of the other system operators have done similar studies, and is there a way to actually pull some of the regional differences and some of the assumptions

and actually be able to pull together several of these studies and actually take a hard look at this? And would that be an opportunity?

MR. van WELIE: Sounds like a great job for DOE actually.

(Laughter.)

MS. HOFFMAN: I need the ISOs to help.

MR. COWART: Let's come back around this way.

MR. NEVIUS: Yeah, just a question. I know we're the Electricity Advisory Committee, but with the increased dependence of the electric industry and the electricity supply on the gas system, does gas storage come into play here, or should there be any review or consideration of the need for gas storage to -- in support of electric reliability? Just a question to think about.

MR. COWART: Let's keep it coming.

MR. MOHRE: There was a comment made earlier. We have to make sure that we do not set in place regulations that will inhibit storage

development.

Last year, if I remember the number correctly, in MISO 845,000 megawatt hours of wind was dumped. All right? Because the system couldn't handle it. And yet -- and, Pat, you know where I'm going with this -- there is a regulation that came out of DOE, another section of DOE, that said you can't have water heaters, controlled water heaters that are over 55 gallons.

We, PJM, and others around the country use large storage -- typically controlled storage water heaters for both absorbing the off-peak load as well as for frequency regulation. This is a big issue. And yet what we have done is passed a regulation that prohibits the production and use of those.

So, thank you for your observation. I think it's on target. We've got to make sure that -- what's the old expression? First, do no harm?

MR. COWART: On this last point, is this

something that we could put on our to-do list for this committee to weigh in on, this very last point about hot water storage? It seems to me to be an obvious one as a result of this conversation, but curious as to what others think.

MR. MASIELLO: I just wanted to chime after Dave's comment. If Barry Smitherman were here, he'd probably echo what ERCOT has said recently that, yeah, the gas system needs to be thought about too.

And you can envision a scenario. It's a cold day, the wind stops blowing, right? Do you have enough gas immediately available?

Let -- it's too soon to try to draw this to a conclusion but can we think about then how we would modify this document so that it could be then something the committee passes on, Richard? Right? I don't mean to try to close it off at the moment, but that's where we need to go with it, correct?

And we'll take up the hot water heater

thing certainly.

MR. COWART: Yeah, I would agree that what our goal in this conversation is to come up with a to-do list and basically with instructions back to the Committee -- the Subcommittee -- to come up with a document that would be crisp and, you know, directional for the Department.

Fred, again? If people don't mind -- okay. Ed, sorry.

MR. KRAPELS: Thank you. I look at storage as a developer and look at economic opportunity. And I completely agree with Gordon that the off peak, on peak spread economic opportunity for storage as far as we're concerned doesn’t' exist, and we're not investing in that.

But there are two other storage attributes that are equally important, perhaps more important and I don't want to throw them under the bus. One is peak-shaving service. WE are going to submit a 50 megawatt storage project into a utilities RFP because we think we can effectively reduce the peak by 50 megawatts.

The service we provide is really a capacity service. In other words, the utility doesn't have to invest in a generator, and it helps that the utility in question is in a place where generation's super expensive. So urban applications for this are terrific, and we're very optimistic about it.

The other one is intermittency service. In other words, not on off peak, but the wind stops blowing, you need something to take a fast acting demand response or efficiency kind of mechanisms such as Viridity Energy and others in that space are developing, I think, are very valuable and shouldn't be forgotten.

MS. HOFFMAN: And we've been using as ramping services just for terminology.

MR. COWART: In keeping with just going around the room in order, if someone has a -- wants to respond immediately to something somebody just said and doesn't want to wait, just wave your arm or something and I'll -- I'll, you know -- I'll change the order.

MS. HOFFMAN: I just elbow him.

(Laughter.)

MR. COWART: This should be a free-flowing conversation here. It doesn't need to be too directed by me. José.

MR. DELGADO: Just two items. First of all, just to add to what you said, we look at it in the Midwest as midnight load creation. Basically sometimes we have too much generation. And it comes very quickly. And we need to modulate a load and we cannot do it with customer load, particularly at times of bad economic activity and the night shift has disappeared.

We have a great difficulty bringing nuclear and coal any lower than that and then be able to serve the next day. We need more load at night. And, frankly, we look at generation -- at storage as a way of taking advantage of that. When you have a whoosh of wind then we can actually handle it because we're having some problems, and we have only a portion of wind that we expect to have. We expect to have much more

than what we have right now. We're really having some difficulties.

And then the other one is when I looked at the very first comment that Frank made, my impression is that this magnificent list of projects that DOE has been putting some money into ought to have some responses which are terribly important at every level, both distribution and at the bulk level.

Now, most of us -- well, I shouldn't say that. I certainly look at the bulk level as the most important aspect because of what I just said. We need an operating tool in order to be able to do so, we need -- with storage being extremely important to us.

But I would like to get a feel for the timeliness of what some of these projects when they're coming through. I'm concerned that we might lose interest before the result comes out. And that we begin to diverge a lot of interest into a variety of other things when, in fact, the industry has a need for proving the

(unintelligible), we know how to do it. The question is what is the cost? What is the dynamics of storage from every aspect of it? How economic is it? You know, where is the best economy? And we need those answers.

I am very leery of losing interest in what has been done so far. We have so much money invested. I would like to make sure that we do push to get some answers and then publicize those answers because the industry is in need of that.

There are many other things that can be done. I haven't spent too much amount of time in distribution, so my imagination in distribution is far more limited except what Mike said makes a lot of sense. Vary locational for a while. Anyways, that's the point I'm trying to make. We need to know when these things are coming, and we need to encourage them to come through because the answers are very important to us.

MR. COWART: Fred.

MR. BUTLER: Thanks. A question, I guess for Ralph on the Subcommittee.

It occurs to me that as we're having this discussion about the place of storage and as the Subcommittee is spending time looking at this, we may be guilty -- or I hope we're not guilty, let me put it that way -- of what students of history like Joe Kelliher and myself always are told about generals, that they're always replanning fighting the last war. And are we looking at today's grid and today's demand curves rather than what we hope will be 10 years from now, 20 years from now, and will -- should we not be encouraging storage and describing storage as something that will have a different role down the road than it does perhaps today?

I'm hoping that's what the Subcommittee's doing, or tell me to what extent the Subcommittee's doing that.

MR. MASIELLO: I think what you see is what we have, Fred, so far. But come back to Gordon's discussion again. There's been a number of regional studies of wind integration in particular. And NREL is doing a national 80

percent renewable analysis.

Most of those did not consider storage. And I think, you know, Gordon is the first I've heard where an ISO is saying, "Look at what this means about storage." So that -- you know, how storage changes those pictures and how the economics for storage change, right, are two pretty important questions.

And I would comment, you know, these studies are great, but 20-year forecasts of technology penetration and economics is crystal ball stuff no matter how many computer models and engineers you have turning the crank, right?

MR. BUTLER: Let me just get real specific on one point. What if we took a look at what we think the grid will look like and what we think the demand curve will look like in 20 years with X number of thousands, millions, pick your term, of electric vehicles on the grid? Will that change the use of storage or the possibilities for storage?

I think that's something that if it's not

being done, we ought to suggest that maybe somebody take a look at that as an Advisory Committee. That's really kind of what I'm saying.

MS. AZER: If I could just jump in on this discussion -- and a couple things, Fred. Yes, the Committee actually is thinking -- and Gordon's comment about unpacking what essentially services the grid provides, I think we're right now unpacking what storage can provide because storage does not fit into any categories, which makes it difficult to even discuss.

I think one of -- in my mind one of the large difficulties in getting storage in action is the lack of our current models to be able to model storage because if, you know, we looked at these models to give us answers on what we should be building. If storage is not one of the outputs, nobody's going to be doing it. And I can tell you in the Eastern Interconnection planning process I'm incredibly frustrated because we can't figure out how to model storage.

It's not going to come out as one of the options. And so I would -- I don't know how we can put this on somebody's radar screen.

And I think part of the problems might be because it's so amorphous, right? It provides so many different kinds of products and services that you're not quite sure how to model it. You can model it, you know, as your -- pumped hydro seems to be the only way in which they can model storage. But if there's some sort of push or recommendation we can make with regards to making sure the modelers get this on their radar screen, I think we'll be more likely to see some more demonstration projects on how storage can be used.

MR. SLOAN: I was with Lauren until the last phrase or so where you talked about more demonstration projects. I think we have, you know, a variety of demonstration projects. My problem relies -- and it goes to that third point on Ralph's summary. And that is how will it be handled in a regulatory environment.

Is it an ancillary service to the three categories you already have, or is it a fourth category? And this is terribly significant to me because none of the utilities with which I deal on a regular basis will look at storage because they can't get a determination from our PUC.

When I talk with the PUC commissioners, they want to act in that judiciary fashion. They want someone to bring them a filing. And it's the chicken and egg thing. Why would I, as a utility, bring something up if I don't know what you're going to do with it? And therefore, we're not going anywhere.

So I come back very strongly to, you know, Ralph's third point that whether it's DOE, whether it's us, whether it's, you know, someone else, we need to define the role of storage, whether it's on a functionality basis or whether it's that fourth category and use that then for policymakers to evaluate, you know, and the model builders to build.

I mean, my second major point is we've

got a study being done now that look at tying a wind farm, a solar farm, and storage together in order to determine whether or not you can -- I'll use the term -- be more base load like with renewable energy and storage capability.

And, again, we're still struggling with, okay, so what does a regulator do with this? You know, whether it's at the FERC or whether it's at our state level.

MR. CURRY: Just quickly, Tom. In New York where we've separated generation and distribution, we still have people around who remember the good old days when that hadn't occurred. And I'll go back to our staff and ask them whether there's a process that we could introduce because we can open dockets. We have lots of open dockets, hundreds of them. We can open dockets on virtually anything.

If we can get the right people together, we can start to take a look at that question because from a distance -- and that's where I'm sitting -- it is -- this is something that cries

out for some sort of refinement even just to take a stab at it to get things started and then catch the flack that comes afterwards.

And I -- we may possibly have more flexibility at a state level than perhaps the FERC has or whatever. So I will undertake that, and I'll be back to you in a dialog on it just to get it teed up right and then I'll coordinate it through here.

MR. SLOAN: That would be ideal because without casting aspersions I do not have a very creative, or innovative, adventuresome commission and --

(Laughter.)

MR. COWART: I heard no aspersions there. Sonny's been waiting.

MR. POPOWSKY: Yeah, I just wanted to get back to the -- sort of the first policy points on the original memo. And I admit I'm not an expert on what these new types of storage can do, but in terms of classification, when I think of the classic pump storage projects like Bath County, I

really think of those as generation-related projects. And even what Ed had just said, whether it's -- I think you said some of them are used for capacity, some of them are used for energy.

And what Gordon said that the key is -- I think the key is the arbitrage between the energy prices. Just because something is done at the local retail level doesn't make it a distribution project. It's still -- if I put a windmill in my back yard, it's still a generator. So I really do -- I'm not sure if the distinction you're looking for, Ralph, is between generation, transmission, and distribution. Maybe it's between wholesale versus retail, which I think is a problem especially -- especially in places like Pennsylvania where at the retail level we only regulate distribution.

And we don't regulate generation. And there's a big difference in a place like Pennsylvania whether we end up classifying -- if something is being done to reduce energy prices,

it seems to me it ought to be probably, you know, it's probably for generation or for energy.

But in any case I'm just saying that I think the distinction may not be so much between generation transmission, transmission, and distribution as between wholesale and retail.

MR. COWART: Now I've lost my -- I've lost track of my -- Ralph, do you want to respond to that? And then I'm going to come back on this side.

MR. MASIELLO: No, I think -- let's let the others comment and then we are getting close to the end of the hour, and we should let Brad discuss the other report, too, so -- and I don't want to try to answer every comment on behalf of nine people either.

MR. COWART: Right. Well, one of the things that we actually should -- as we wrap up this discussion in a few minutes -- we should try to recap in bullet form some of the actionable points that have been made.

So keep that in mind. If you were to

make the to-do list following this, what's going to be on the list? Wanda.

MS. REDER: Yeah, I would only say that, you know, I think we're trying to categorize these benefit streams into buckets that we know, retail, wholesale, generation, transmission, distribution. And as I think of storage, you know, it doesn't matter where it's located. In most cases you can find benefits streams that apply across the board.

So I think back to José's comment where, you know, we really need to take a good hard look at the outcomes from these demonstration projects and classify the benefit streams and then come back to the implications of, you know, from a policy perspective how this applies.

I'm afraid if we get into a situation where we're trying to, you know, use our traditional paradigms, we may preclude the implications in moving forward with storage technologies.

MR. ROBERTS: One comment. With the

Electricity Storage Association I think if you look at the comments that were made, there's a crying need for a major study to be done. The SA's resources have improved to the point that we think we can drive that now to start making that happen sooner rather than later because it's clear the message is there. There's a lot of other studies that have been done, but nobody's tried to really grab a hold of the storage issue and say, "Okay. Let's look at what this means. Let's look at the next 20 years."

One of the concerns we have is there's reports that say 20 percent wind by 2030. Well, that's the random kilowatt hours. We should have 20 percent renewable on peak 20 years from now. And so -- and I don't think you can get there without storage, quite frankly.

But -- so, I think this has been a good discussion. I think it's pretty clear what some of the action items are because the regulators just don't have anything they can look at or put their arms around to say, "Okay. Now I'm

starting to understand this." So --

MR. COWART: Thank you. Coming back over here, Mike?

MR. HEYECK: I just wanted to try to kick it up a bit. I was triggered by Fred's comment earlier of what's the grid going to look like 20 years from now.

I'm not sure any one of us can get the crystal ball out, but what we do know is that we're going to have less -- we're going to have more Just in Time. Our energy infrastructure in the United States is more Just in Time. We're not going to have a 60-day coal pile sitting out in the back yard. So, if we have Just-in-Time Energy and infrastructure, we absolutely do need energy storage.

So is it our job to really develop the economic model? I think it's our job to reduce the impediments. So let's reduce the impediments of the wholesale market. And I think the purview of creative thinkers and FERC would help there. On the regulated side, I really don't want to

impede.

So whether it's a distribution or transmission, how it's justified is you go to the regulator saying, "I can justify this battery by saving $50 million for four years." And that's how you would do it.

But right now we're still at $5,000 a kilowatt or somewhere in that neighborhood and it's very expensive. So the propositions are increase the volume to reduce the cost, but please, let's not demonstrate the same technology over and over and over again. Let's actually demonstrate better technology.

So, you have the wholesale market. Reduce the impediments there. The second is if you're going to incent or with Stimulus or with tax credits, let's do it on the -- not rolling out what we already know but rolling out something new so that we can get the prices down and the technology up.

So, just kicking it up, I think our job is really to reduce impediments to drive the

technology and to increase the volume which would hopefully reduce the price.

MR. COWART: Dian.

MS. GRUENEICH: One of my themes today is probably going to be encouraging the group that we take the information that's being collected by the Stimulus projects and think about how that then folds into the information that we have in the policies.

And so looking at the report that, as I understand it, puts together in one place all the various types of projects that are being funded in the area of storage using the Stimulus money and then putting together the policy report, I'd like to have sort of some crosswalk over between them. In other words, since this is a DOE Electricity Advisory Committee and this is money being funded under the auspices of DOE, some way that we understand who is collecting information from all these various projects, what type of information is being collected, and how that information could then be used to help answer any

of the questions that are listed on the policy page.

And I mean one example might be, you know, are these projects that are being used to help on the distribution side or not, and which ones are and which ones aren't because, again, it seems to me we've got all this money out there, let's collectively understand what those projects are telling us about because I think that gets back to the point about in order to spend money wisely, we really have got to get a handle on what are we learning from these demonstration projects so that we don't just repeat more and more demonstration projects but understand where they're taking us, how are we driving barriers and costs down.

MR. COWART: Any other comments? Why don't we just move on to the next item, Ralph?

MR. MASIELLO: Okay. And then I'll -- I'll work with the group to try to summarize what we heard and provide that back to you.

MR. COWART: I might actually try to get

this larger group to go through that process in five minutes, but let's first hear --

MR. MASIELLO: Okay. The other item, I think, is to give Brad an opportunity to summarize the --

MR. COWART: Right.

MR. MASIELLO: -- high level here's what's going on.

MR. ROBERTS: Thank you. What I tried to do is kind of give you a perspective of what the world looks like as far as storage and what's in the United States. We're a little over 2 percent of the generating capacity of the system is made up of storage. We haven't seen any molten salt projects in this country yet, but there are some in the works going with solar activity.

The compressed air system, there's only one in the United States. The Stimulus program, I think, has two or three projects that are trying to supplement that.

I think we're seeing real success on the ancillary service side with what we call fast

storage. The economics seem to make sense there. It's been proven that fast storage accomplishes the same task with 40 percent less energy and so that's a win-win for the rate payer. And so the economics of those projects seem to be able to stand on their own without any kind of Stimulus other than in a couple of cases some DOE loan guaranties. So that's encouraging.

There is a fair number of potential new pumped hydro projects that are kind of on the books and trying to be sited and approved, which is a fairly big task to do. New pumped hydro systems are much more effective in the fact that they can participate in the ancillary service market when they're pumping or discharging. So, with variable speed drives on the pumps that gives them a lot more flexibility and a lot greater value.

One thing I think we need to keep in mind going forward -- I didn't try to address it here -- is that storage is not something that's kind of -- is trying to compete megawatt for megawatt

with -- with other forms of generating capacity, particularly on the renewable side.

We're at 2 percent now. My estimate would be -- and this is mainly me talking and not the Electricity Storage Association, but some of the studies that have been done would indicate that maybe up to 10 percent capacity is the number. So, it's not like we're trying to roll out hundreds of gigawatts of storage. If it achieves 10 percent 20 years from now, that would be huge. Whether it'll be quite that big or not we're at 22 megawatts, 23 gigawatts, right now. Probably at least another 50 needs to be added.

So it's not an overwhelming number because it is a very valuable resource. And that message hasn't gotten across yet. And so I think studies need to be done as indicated in here and educational processes need to be improved. And so I think if we help define some of that in our reports going forward, we can achieve quite a bit. So any questions about the report or any comments or -- DOE provides good summaries of

where there -- the status of their different projects and so that is a very good overview of kind of where things are but try to give you the bigger perspective of kind of what this market's all about.

Just Around the World is an example. Japan is trying to get to 15 percent. Japan it's a much easier process because their arbitrage value of electricity is huge. It's about 600 percent from night to day, so, you know, that's a much easier task to deal with.

And Germany's trying to get to about 20 -- about 10 percent. So, this country is going to be -- fall, I think, somewhere between 5 and 10 percent over the next 20 years. And so just to try to give you a perspective of what this looks like.

That could change potentially with more cars, but, you know, storage and cars is probably going to become a two-way street down the road. Right now the batteries in cars are so valuable that you really only want the energy to go one

way. But you can smart charge a car and participate in the ancillary service market. So that's been demonstrated in PJM.

So, eventually though I think the value will be such that an individual can decide whether to use their own energy or not as a part of their daily life.

And so I thought Mike's comment about Just-in-Time Energy is excellent. The way I refer to it as 20 years from now the power grid's going to look like the internet. And so it's -- you know, power's going to be entering and leaving in millions of locations. And you're taking an industry that 10 years ago power entered from maybe 3 or 4,000 points. And now it's up to hundreds of thousands at this point, and millions is right around the corner. So --

MS. HOFFMAN: Just want to add to that. I know that I had a conversation with Mr. O'Reilly, I believe, in -- for Ireland. And they have, like, 60 percent of gas that they use to balance the wind, but they do have a pump storage

facility. And so taking some of the lessons learned from other countries is valuable but also recognizing that our structure and our system is different which kind of goes back to having folks that have the knowledge to do some of the studies and say, "What are some of the requirements for the system?" As we go back, it's even more looking at long-term resiliency and reliability, and low cost of electricity, and how do we set up the structure. We can rely on natural gas. We can rely on demand response, but what is the cost and potential cost impacts as we balance the whole system?

MR. COWART: All right. Now I have the idea that in the next five minutes or so if we don't mind recapping a little bit.

I can tell you the ideas that I took out of this conversation, and I’m sure I missed a few. So I'd like people to chime in. Have you been making a list, Ralph?

MR. MASIELLO: Yes.

MR. COWART: So, do you want to start

with your list?

MR. MASIELLO: Why not? I think we heard strongly that regulators need information, and it's important to remove barriers to technology development but too soon to try to codify everything into firm buckets perhaps, one.

Two, address gas storage. Three, the hot water heater discussion I'm going to abstract to say think about thermal storage because the same kind of issues occur in the large with building efficiency standards and how you operate buildings.

Four, there's a need for research -- and it comes back to number one. There's a need for some more R and D into the cost-benefit and a linkage of that to information that comes out of the projects, the various development projects, and the cross-linkage between the data from the R and D projects and the policy discussion.

I'm not sure quite what to do with the 2030 what's the future of the grid because that's a little bit larger than just electricity

storage. And it might be something to take up at a broader level with the Committee. Those are my notes.

MR. COWART: And you did such a good job because you just ticked off my list. The -- I want to emphasize a couple of things.

What I heard Lauren say is that -- and I would agree with this as a former regulator -- that I can sort of see how state regulators would be lost in this right now. And I can envision that it would be quite useful if DOE could commission the work that would help regulators understand the options that they have.

I don't envision DOE ever telling the state regulators, "This is what you should do on this kind of thing," but I do envision, you know, advancing the dialog in a way that would really help to -- help the regulators to move forward in this area. So I'm echoing your point and you heard that as well.

The point was also made that current models, system planning models, don't really know

how to deal with storage. And there was a recommendation that -- and I don't actually know how this would happen, so maybe there are other -- there are smarter people here who would say, "Well, this is actually how this would go forward," but it sounds like a good -- do you have a comment there?

MR. MASIELLO: Yeah, I was going to put that on the to-do list for the -- as another item.

MR. COWART: Good.

MR. MASIELLO: There's a report out from Pacific Northwest National Labs that specifically speaks to what commercially available analytical tools for transmission and distribution planning have and don't have with regard to storage. And we could disseminate that to the full Committee. It's a -- I mean, you can take issues with it as with any report but it's there, and it's not bad. So I'll distribute that, Richard.

MR. COWART: Okay. But it does seem like a lab kind of project, frankly, that the labs

could look at the models and come up with some recommendations for improving modeling to reflect storage more robustly as an option in modeling exercises.

MR. MASIELLO: Yeah, let me put on my for-profit hat a minute and say that's great, but it's good if they got participation from a number of commercial entities, not just one, also. Sorry.

MR. COWART: That's well taken. I think that would be -- I'd expect that to show up in your bullets.

(Laughter.)

Your point about thermal storage and recognizing -- in fact, I would extend it a little bit taking up on Fred Butler's point about electric vehicles. When we look forward, we know we're going to be looking at a grid that will need to incorporate much more actively both thermal storage and smart charging of vehicles.

And it's true that we can't predict and we don't really, frankly, need to predict what

year that's going to happen and how deep the penetration's going to be or whatever, but if we just start by envisioning an end state which we know we're going to be at at some point with a lot greater penetration of variable generation, and then we ask the question how can we incorporate both what might be called really active storage and also thermal storage and smart charging of vehicles, timely charging of vehicles, we can envision a package that I believe we know we're headed for.

And so I think it's really smart for the Storage Subcommittee and for this committee to include those categories as categories of action for the Department.

Dian's point about let's evaluate the results of the ARRA Studies, let's make sure that we're actually going to get -- or the ARRA Pilots -- that we actually get the Stimulus money effects evaluated sensibly and -- and that would be something that this committee would want to take a look at, I think.

And I think that's -- maybe I'm -- want to add to the list? Sure.

MR. BARTELS: No, just a few general comments. So, I think, first fully agreed with Dan's comment about linkage to ARRA and perhaps even in that same context I think we, as a group, not only for storage by the way. There is such a massive amount of reports and studies on so many of the topics we discuss that we do a report. We put it in a drawer, and we start writing a new report, right? So, general comment, I really would like us to look back when we say a report is good, let's see whether we can put more action behind that.

And more general question to the Smart Grid Subcommittee is that I was once at an event with a sea of large utility, and he got the question, "What is the single most important technological breakthrough for you?" Right? And he commented without any doubt, "Storage."

So, if that's the case -- and I'm not a storage expert at all -- but are we as a team

here doing enough in asking us that if we agree with that notion, right? I don't know whether everybody agrees with it, but are we doing enough in this space?

MR. ROBERTS: And one other comment, as far as trying to look at the future, if you look at the wind energy industry has a projection of what they think this is going to be. The solar folks have a projection as to what they think it's going to be. There's projections out there of penetration of electric vehicles. So I think you start there with here's the industries saying this is what their industry is going to be. And you pick those numbers, and then you try to sort that out to see, okay, what would that look like. And I think that's where you start basically.

MR. CURRY: I would suggest it only (inaudible).

(Laughter.)

MR. COWART: Anything further to add to the Committee's list of instructions and requests?

(No audible response).

MR. COWART: We okay? All right. Thank you very much.

Now --

MS. HOFFMAN: I just want to say thank you. That was a very good discussion. It was very helpful.

MR. COWART: David Meyer reminds me -- and I think we'll talk about this at the break and then come back with some form of recommendation that the -- this committee needs to take a formal action with respect to a storage report at this meeting. And so I think why don't we just confer at the break as to how we want to characterize that action.

Well, we're pretty much on schedule and ready to hear the report from the Smart Grid Subcommittee. And I'm going to turn it over to you, Fred, and if you don't mind managing the rest of it, that would be great.

MR. BUTLER: Not a problem. Thank you.

The purpose of this Subcommittee report

is twofold. One, to tell you what we've been doing; and also then to get some feedback from members of the Subcommittee who have had some time now to think about the things we talked about at the Subcommittee call and also from the other members of the Committee as to what we should be looking at and other things we should be looking at. And I have my page to takes notes, Mr. Chairman, so that I can be ready at the end.

We have for you a sound and light component to our report. We're going to have a slide presentation from Joe Paladino, who's sitting there at the end of the table, from DOE on some -- in honor of Dian Grueneich's theme of looking at what the ARRA Stimulus Funding did, some things that are already being done that the Subcommittee took a look at.

And in your packets you have a two-sided chart like this because if your eyes are like mine, looking at this up on the projection may not be terribly helpful. So I ask that it be

reproduced for your packet so you could take a look at it. This is one of the most important slides in the presentation, so you have it there in front of you.

The Subcommittee met by phone last month, and we had a full-blown presentation on this ARRA benefits analysis framework, et cetera. We spent a good period of time talking about that and then also talking about some possible other projects that we might undertake. And those other projects include taking a look at the 2009 Smart Grid document that was produced by the Subcommittee and the previous EAC and seeing whether that needed to be updated or what value we can use from it and going forward.

We also want to take a look at the Five-Year Smart Grid Program Plan in the Department and the Long-Range Smart Grid R and D plan in the Department.

The main focus of what we're going to be doing in the short term -- now these are all short-term goals -- is to look at the ARRA Smart

Grid Programs. And so at this point I think I'll turn it over to Joe to give us this presentation and to explain what it is that they've been doing with a view towards having the Subcommittee comment on -- and analyze his comment on it and make any midcourse corrections that we think might be -- might be necessary.

So with that, Joe Paladino. And, Joe, if you'll give your title.

MR. PALADINO: Thank you. Thank you very much, Fred, appreciate it.

And I'm guessing I'll go about 20 minutes and --

MR. BUTLER: That's fine.

MR. PALADINO: Thank you very much. It's a pleasure to be here. Fred, thanks for having me here. I really appreciate that.

My name's Joe Paladino. I'm a Senior Advisor within the Office of Electricity. I was intimately involved with crafting the grant and the demo ARRA Smart Grid solicitations. And at the same time I also worked with the team to

develop the methods by which we would gather data from those projects, do analysis on that data, and then convey that data to the public.

And what I'd like to do today is review with you what we've done and then in the end get your comment. Good.

The funding -- the Recovery Act funding that we receive basically translated into funding 140 Smart Grid projects. The total amount of funding was roughly $4 billion. Three and a half billion approximately, went to 99 Smart Grid grants. And 600 million went to the demonstration programs. And there are 32 of those. Actually, there's an extra nine of those but -- so perhaps 40 in all, but of those demonstration projects there are 16 that are energy storage projects. And we are going to be gathering information on those projects.

The funding basically translated into purchasing and deploying -- we're in the process of deploying now -- Smart Grid assets in various parts of the grid.

So, for instance -- and we're still doing the count, but in the next three years we anticipate getting probably 16 million plus meters, mostly residential on the grid at -- a subset of those will be connected to in-home displays, and energy management systems, and other things within customers' premises. We will also be deploying technology into the distribution system, like switches and sensors, and communication systems. In the end we'll probably affect about 4 percent of the distribution feeders in the United States.

And then we also have phaser measurement units and associated communications and networking technology that's being deployed in the transmission arena. There were about 166 network phaser measurement units in place before we started. And we're hoping to have over a thousand network phaser measurement units in place when this is done.

And then, finally, we also are funding a few projects that are equipment manufacturing

projects. For instance, Whirlpool is one of our recipients. And they're developing appliances with Smart Grid features. So we're going to be looking, for instance, at the adoption rate of that technology into the marketplace.

Within this system -- I just wanted to mention because as we've just talked about energy storage, we're going to be getting -- we're going to be seeing energy storage devices within distribution systems, and we're going to be seeing energy storage also within transmission systems.

There are basically two areas that we want to focus on. One deals with how the customer relates to Smart Grid technology. And, in fact, there's a subset of these technologies that I'll talk to a little bit more that also involve dynamic pricing, but I also want to say that at the outset here with you that we are technology neutral. So we're not necessarily condoning or promoting dynamic pricing projects. In fact, we have a lot of direct load control

projects which are involved here. We really want to observe the result that we get. We want to observe and determine empirically what is the benefit of Smart Grid technology. Is there a benefit? That's the first question.

So we're looking at the customer space and how customers respond to this technology and associated policies with the technology like dynamic pricing. We also want to take a look at are we advancing grid functionality and are we actually creating a delta in grid performance at the transmission level and distribution level.

And we're going to focus in very specific areas where we'll be looking at how much we're reducing peak load. We'll be looking at operational efficiencies. For instance, how much we're reducing operation and maintenance costs. We'll be looking at energy efficiency. You know, how much more energy efficient as a system because we're reducing line losses. For instance, (unintelligible) control may result in improved efficiencies across the system. We'll

be looking at grid reliability. For instance, you know, SADI, SAFI, et cetera and deltas that we see in those.

And we'll be looking at the adoption of synchrophasor technology. What's interesting here is -- and what I'm learning, I spent -- a couple weeks ago I spent three days with folks from the North American Synchrophasor Initiative. And all the recipients, for instance, they're getting this technology from us are in that program. It's going to take a while for that community to adopt and apply this technology as you probably know.

So, are we going to actually see grid impacts by the end? Not sure. But we -- we'll hopefully be able to see operators in some cases actually applying the result of the data that's coming in from this technology.

And then finally given reduced peak load, operational efficiencies, energy efficiencies, reliability improvements, et cetera, we want to be able to measure if there's any environmental

benefit that can derive from improved grid performance.

So, we actually have been developing an analytical framework. It's actually translated into a spreadsheet tool with all the underlying algorithms, okay, for about the past four years. And it really derived from work that was done originally in California with several utilities. It's evolved -- pretty much to look at the distribution space, but it's evolved from that, and in fact, we work closely with EPRI. And there's a document that actually captures very, very well the analytical framework. It's an EPRI document, but it was actually mostly funded by the Department of Energy, but we have a very good relationship with EPRI. It's a joint DOE-EPRI project.

This book -- and I can get it to the group here. It's called *Methodological Approach for Estimating the Benefits and Costs of Smart Grid Demonstration Projects.* It captures our analytical methodology with all the underlying

algorithms. And it does it very, very well.

I'm going to talk about this a little bit more later on, but we are actually working with recipients and stakeholder groups like Edison Electric Institute and others to advance the methodology.

So how does the methodology work basically? First, we want to understand what assets we're deploying. And we have lists and lists of assets which we call build metrics in the -- again, in the distribution space, transmission space, consumer space. We're collecting all of this information from each recipient. I'll get into that a little bit more.

But, for instance, an asset would be a capacitor control. Okay? Like a switch, et cetera, a faster switch or an automated switch and behind it a distribution management system. And then what we want to do is we want to map what assets are being deployed to what functions they're actually providing on the grid.

So, for instance, this technology would

result in automatic voltage and VAR control. And so there's a host of functions that we want to map against the assets. And then what does that function do? It actually improves feeder voltage regulation.

And as a result of that, what happens is -- is there goodness that actually results from that? And again, we're going to measure this empirically, but for instance, we could reduce feeder losses as a result which could be worth, for instance, $60 per megawatt hour, and then we could translate that into a monetary value.

We're going to be measuring benefits for each project of the 140 projects. And we're also going to be rolling them up so that we can take a look at the overall cost of the ARRA funding against what we think is the overall projected benefit that the program provided. So we'll be doing -- we'll be working at a project-specific level and we'll also be working at an aggregated level.

Now I -- these are my favorite slides,

and I -- the reason that you've got your handouts is so that you can actually see what's on this slide. But there are two slides here. There's a slide that's entitled "Assets to Functions", and then there's a second slide that's entitled "Functions to Benefits".

And essentially what we've done is we created an algorithm where we're actually mapping Smart Grid assets to functions. And functions include things like -- again, I mentioned automated voltage and VAR control but also automated feeder switching, adaptive protection, measurement and sensing of equipment. And so we're mapping. We're actually mapping assets to functions. And then we're mapping functions to benefits.

And we have 22 benefit streams listed here. And we're working with each recipient of the 140 recipients to develop a customized template based upon what their project is doing with respect to deploying assets and what kind of functions they're hoping to achieve. We're

trying to map that effort to what benefits we're trying to get out of the project. It's a huge task. Again, there is a customized mapping with each project. And the way we do that basically is with each -- we have a team. I'll talk about that a little bit more later on, but we've developed metrics and benefits plans for each project.

And then over the next five years we're going to work with those recipients, each recipient to actually figure out how to do this because this is our best foot forward, but now there's going to have to be a lot of evolution to take this to the next level.

And there are lots of recipients that we're working with as well as the stakeholder groups that want to work with us to advance this methodology.

There's a computational tool associated with this methodology. What it basically is is a spreadsheet tool. It is under beta testing right now with about six utilities. And we're actually

working with EPRI on this. And again, other utilities want to work with us. We're -- that is going to be freeware. We're hoping, like, within the next month -- and I promised Ms. Hoffman over here that we would brief her on it, so, Pat, I promise you that we will do that. She's been trusting me to date, and perhaps I need to check back in with her.

(Laughter.)

MS. HOFFMAN: (Inaudible).

MR. BUTLER: And now that you've said that publicly, yes.

MS. AZAR: You realize that's for the record.

MR. PALAINO: That's okay. We -- and for the record, Pat and I speak all the time about this. So there's -- this is not -- this will not be -- she under -- we've been actually working together on this for actually the past four years, so -- anyway, so we're going to make this tool freeware, okay, and then hopefully evolve it from there. Okay?

There's a subset of projects that are going to be doing rigorous consumer behavior studies. And these studies are supposed to do two things. A, they're supposed to look at and examine what affects at the acceptance of consumers to dynamic prices and to dynamic pricing projects. And given that a consumer does accept the project -- accept the pricing program, what is actually their response to the dynamic pricing tariff?

We're looking at a variety of tariffs. We're looking at, you know, critical pricing, rebates. There's no true dynamic pricing project, but if you take a look at the 70 or so projects that have been conducted to date in the country, you'll see there's a lot of variance with respect to, you know, what kind of customer response and acceptance that folks are getting from each of those dynamic pricing projects. So we were actually -- we worked with the Council of Economic Advisors and others to develop what we think is probably the most rigorous approach to

develop -- to undertaking these studies. So in the end there might be something external that we could derive from them, but in the end -- and what I think what we're learning, is that what we're doing here is really helping the local decision. It's helping either the Public Utility Commission or the municipal government really understand what -- how customers are going to respond to dynamic pricing and what they need to -- what they would like to implement at the local level. So we truly respect the local level.

And what we did here is we assembled a technical assistance group. This is led by Chuck Goldman and Peter Cappers at the Lawrence Berkeley Lab. We have about 15 what I would consider to be experts in the arena of dynamic pricing, statistics, setting up experimental designs. And we are, again, just like with the metrics and benefits matrix I showed before, we're working with each of these recipients in a highly diligent way to set up the experimental design which includes setting up valid control

and treatment groups. Treatment group would be, you know, a group that is going to be exposed to a certain dynamic pricing. Rate structure.

With pricing we also have -- with many of these projects we also have technology embedded in it. And so, there is -- for instance, some of the customers in addition to pricing projects are going to be getting in-home displays and other information feedback technologies. They'll also be getting technologies like programmable controllable thermostats to help them control.

And so what we want to do is we want to tease out the effect as rigorously as possible in a methodologically sound way to tease out the effect of pricing versus enabling technology and, in fact, versus the kind of education they're getting and be able to, again, examine with respect to that backdrop what their acceptance rate is and what their response is to dynamic pricing towers.

We're going to be randomizing treatment groups so that we try to eliminate to the best

extent as possible selection bias. This is not easy, obviously. And we're going to be collecting highly granular hourly meter information that will last for -- that will go between one to two years in length at a customer lever or a customer cohort level. So, in fact, we'll be producing a highly -- a very rich data set that will correlate to man, rate tariff design, customer level -- and customer level information. That will all be downloadable. That'll all be released to the public. And in addition to that we're going to be doing a meta analysis to examine various factors that cut across each of these projects.

Right now we have six approved consumer behavior study plans. These are five-year projects. Over the next three years is when we're expecting most of the assets to be deployed, and we want to be able -- we're gathering information to actually keep on top of actually what's deployed. We call those build metrics. They're going to be reported to us

quarterly. We'll be publishing that information quarterly. And the build metrics basically are what are the assets, how much do they cost, what percentage of the service territory are we covering, who's getting dynamic pricing pilots. It'll be highly granular information that we'll be publishing, again, on a per project basis and an aggregated basis.

The tricky part here -- the real tricky part here is actually determining what is going to be the impact on grid performance. And so, again, with each of the recipients we're taking a look at how we're going to baseline their performance before they deploy the technology.

And then once the technology is deployed, we want to be able to measure impacts. For instance, deltas and operation and maintenance costs, deltas and truck rolls. What's the delta in reliability, et cetera, et cetera? And, in fact, we've got a guidebook that we developed which lists in detail the hundreds of build metrics and -- well, if you add it up, it's

probably about a hundred, but the hundred build metrics that we're collecting as well as the hundred or so impact metrics that we're going to be collecting from these projects -- and it's a very arduous task, but quite honestly, what's been very interesting here is going into this we really didn't know how willing recipients were to do this because this is not an easy task, okay.

What we found out, fortunately, was that, A, everybody is hungry for this information. They're really hungry for this information, and they want to work with us to help develop it. So that was very, very encouraging.

We have teams set up to do this job. We have a benefits analysis team. These are the folks that are going to be -- they're working with each of the recipients to develop the plans and then to be able to take a look at the data they're providing and do analysis on the data with the recipients. So they'll be working with each recipient with respect to the build and impact metrics and undertaking the benefits work

-- benefits estimation work.

We have another team that I had mentioned, the Technical Assistance Group, an advisory group, which is working with each of the recipients to conduct the consumer behavior studies. We have a database located at the National Renewable Energy Lab. All the project teams are submitting their data to this -- what we call the Data Hub. And that is basically a relational database. We'll be doing analysis on that data, and then we'll be posting that information on a website we have called SmartGrid.gov. That information will also be sent over to the Smart Grid Clearinghouse, which is also a DOE Virginia Tech website that is supposed to be serving the public. And, again, we have a bi-annual report to Congress called the Smart Grid Systems Report. We want to be able to feed that, obviously, because we're impacting a lot of Smart Grid deployment in the United States, and we want to -- we want to be able to report that.

You'll see the groups on the right. I will speak a little bit more to the stakeholders that we are working with actively in this.

One thing I did want to mention is that we do have a focus group. Actually, we have more than one focus group set up. We have a focus group with all the consumer behavior study recipients. They get together every two weeks, and they talk about how they're going to work through issues, how they're going to work through analytical issues, how should they approach a certain part of their experimental design, where they're having issues with respect to communicating or lessons learned with respect to communicating with customers.

And we're actually going to be enlarging that potentially with EPRI because they also have a set of consumer behavior studies that they're supporting.

I won't go through this. I also -- I've spoken to this. This is what we're expecting reporting-wise. Again, on the grant side we're

going to be reporting build metrics quarterly, impact metrics semiannually. We'll be doing a meta analysis of all of this information. We want to be able to advance the methodology so that we can support business case analysis so that we can actually, you know, use the empirical data we've got and the algorithms we have that will be able to support utilities' ability to do business case analysis.

And then I've mentioned that with respect to the consumer behavior studies, again, each of those projects we'll conduct a -- we'll provide a report. We'll be doing a meta analysis, and there's going to be all this raw data.

With respect to the demo projects, we're going to be collecting build metrics, but we're also going to be having each project provide technology performance reports. So with respect to energy storage projects, we will be -- in these technology performance reports we'll be assessing the performance of the technology, and we'll be looking at the cost/benefit aspects of

the technology. And all that is going to be reported. And, in fact, I've got a meeting this afternoon where we're trying to finalize really what the -- what that guidance is really supposed to look like.

Current efforts with stakeholders, we want to do three things. We wanted to address data-gathering analysis issues because there are a lot. We wanted to advance the benefits estimation methodology that I showed you. Recipients want to work with us to do that. And we want to be able to share consumer behavior lessons learned.

So who are we working with? We're working with NARUC and staff from the public utility commissions. We actually have a focus group set up there that we meet with on a regular basis. There are staff members from the utility commissions. There is one commissioner involved there, and there are folks from NARUC, and we meet with them regularly.

We meet regularly with Edison Electric

Institute and EPRI. We've had several meetings with APPA, several meetings with National Rural Electric Cooperatives Association. And I've mentioned a meeting that I had last week with North American Synchrophasor Initiative. We have a focus group there. All the recipients are going to be working together with us to be able to report on how they're -- how well this technology is being built, how the system is being built and progress on that as well as what kind of applications they're expecting to use. And then finally, we're going to be working with consumer advocate groups.

So here are the questions. This is the last slide. Sorry for going so long here, but again, this is -- these are the questions that we propose that you might want to look at with respect to what we're doing.

Is the analytical approach sound? What should be the objectives or stakeholder strategy? How do we convey the progress and impact of ARRA programs? What should our communication strategy

be? And then how do we integrate the ARRA programs with the base corporate R and D program? And that's it.

MR. BUTLER: Thanks, Joe. Observations, questions for Joe? We're going to start with David at that corner and come around the table. David?

MR. NEVIUS: Thanks, Joe. Thanks for the presentation.

I've got one comment and a couple of questions that may get down into the technical weeds, so I apologize in advance.

On the comment I think the synchrophasor applications is going to be a really major issue for bulk power system reliability. And it's how to take all of these very sophisticated measurements of the system and put that information in terms that system operators can use it to detect the beginnings of system oscillations that may be occurring many systems away and what actions they need to take. Knowing that the system is oscillating a certain way is

one thing, but what do they need to do --

MR. PALADINO: Uh-huh.

MR. NEVIUS: -- to prevent those oscillations from growing and working in a widespread, cascading outage. So that's going to be the real challenge there, but first you have to have the data on what's really happening on the system.

The other two technical questions -- I noticed that in one of your earlier slides you had capacitor controls listed as one of the Smart Grid assets. And having been involved in the mid 1970's on some radio controlled capacitor programs, I wonder what's new that makes that a Smart Grid asset.

MR. PALADINO: Uh-huh, yeah.

MR. NEVIUS: Secondly, the --

(Laughter.)

MR. NEVIUS: Other than other people should do it.

And secondly, you list the benefits of being able to have better voltage control in the

distribution system. I think the benefits are greater than that. I think it lets you optimize your reactive supply throughout your entire system because there's an old saying a VAR at the load is worth two at the brush. That was before brush was exciters.

(Laughter.)

MR. NEVIUS: But, seriously, you know, optimizing what's the reactive -- the deployment of reactive resources on the distribution system can also benefit the bulk system because then you don't have to draw those VARs off of the bulk system. So I think you should expand that benefit a bit there.

And also, again, just a question about what makes this something new and different than what was in place before. Though, the other one is similar on phase shifters. I mean, they've been around for a while, and I come from the land where phase shifters were born in New Jersey, between New Jersey and New York, so again, they were used for flow control between systems.

There's even a variable frequency transformers in place in Texas. And that's a very, very old technology originally developed for use at hydro plants. So, again, what makes that a new Smart Grid asset as opposed to just something that has been deployed many years before?

MR. PALADINO: Okay. You know, you bring up a good point, but the rate of evolution of Smart Grid technology has varied from utility to utility. And then the ability to be able to draw information from either the sensor or the device that's out there and be able to bring it back in to some corporate, you know, system where there are operators that are actively controlling that -- the distribution system, and to be able to make decisions with respect to those.

I think what we're doing is a -- we're helping deploy more of the technology that may have been on the shelf for a while, but where we're also -- with the communications systems behind those, being able to -- because of deploying the technology, being able to advance

the ability of operators to really understand what the information is and to be able to better control their systems.

So a lot of -- in the grant program a lot of this technology was basically off the shelf technology. I mean, that's what we were trying to do in the grant program. Now the effort really is going to be, you know, gaining the experience on the operator side to be able to apply the technology. And I think that's where we're probably making most of our, you know, impact.

MR. BUTLER: Okay. We'll move to Wanda. And I want to ask if we can -- Joe, if you can just maybe take a note or two on some of these and respond once we get around the table.

MR. PALADINO: Okay.

MR. BUTLER: Wanda.

MS. REDER: Yeah, I would just say that we need to think about the metrics that are used going forward. In a lot of cases I believe we quantify the benefits using metrics of what we've

used operationally in yesteryear. And to give you some examples, does it make sense to classify an outage as five minutes? I would suggest we're probably moving beyond that right now.

If you look at all of the effort that's gone in to capacitor banks and, you know, voltage and losses, does that make sense that that's a pass-through from a distribution perspective? I mean, who are the beneficiaries, and are we establishing recommendations so the beneficiaries -- you know what I'm saying? So I think that we have to consider that in the reports, and the outcomes, and the findings establishing a framework.

Another example is load factor. On the storage piece there was some good data that was a coupling between the Energy Association and EPRI suggesting in the '50's our load factor as a country was in the 60 to 65 percent range, and now we're dropping to around 50. So we have build the infrastructure for much more peakier type of load profiles. So we need to incentivize

a way that, you know, encourages better optimization. And I don't know that that's really built into our policy making and our metrics going forward.

So these are some examples. I think that we have an opportunity here to kind of step backwards and look at the benefits from the aggregate and think about, you know, the models and how we measure now and make recommendations on what we need to do going forward.

MR. BUTLER: Thanks. Mike?

MR. WEEDALL: So, two quick thoughts. One, Joe, is I'm really fascinated by the consumer analysis you guys are doing. And I believe you mentioned this in your comments, but would really encourage you to make sure that you're looking well beyond just the pricing signals because, you know, certainly experience we've had, I've had, has been that there's more powerful approaches out there than just necessarily pricing. And, you know, to really get the types of response you need a whole bag of

tools. So, you know, I'm going to take a note because I'm going to start bugging you on this work because I want to start to follow that more closely.

The second thing I would just point out is more awareness that we have been developing a tool out in the Northwest kind of building off, if you will, the EPRI analysis that's really intended for our customers, the 130 plus distribution companies that we serve, where they can analyze specific elements of Smart Grid and determine what the benefit cost ratio would be for them to invest in this.

And where -- I mean, we've been working a couple years on the methodology. We're very comfortable with the methodology. The information's crap, so, you know, it's, you know, unfortunate, but it's going to take us all several years to really be able to get to the point where, you know, we're going to be where we want to be to, you know, give our customers the information they need to really understand, you

know, what they should be investing in, what's, you know, going to be the highest priority. So we're more than happy to share that, you know, with you and certainly, you know, others that are interested.

MR. BUTLER: Thank you. Lauren?

MS. AZAR: My comments may be a little unusual, but I would -- this document is fantastic. And as a regulator, I can tell you I've heard the term Smart Grid now for, you know, five years. And when I hear it, I'm like, "Oh, yeah, whatever."

And when utilities come to us, they generally don't talk in terms of Smart Grid. They talk in terms of specific technologies. So I understand why we have to put things within the rubric of Smart Grid, but I would start -- I think it's going to be an easier sell to get money from regulators if you start talking about specific technologies and what they do, rather than putting it under the rubric of Smart Grid.

And, you know, this -- I was saying to

Pat, "This is fantastic." And, you know, having regulators and their -- more importantly, their staff understand how much can be saved and what sort of stability can be provided in the grid is not only important to give to the utilities but to the regulatory staff so that they understand that.

But I would really, you know, folks like the term Smart Grid, and it's way too amorphous for me. When you start talking about very specific things about, you know, voltage stability, things like that, I get that. So, just a thought.

MR. BUTLER: Chairman Cowart?

MR. COWART: Well, I have a comment and a couple of questions. The comment is I'll echo what Lauren just said. I really appreciate the thoughtfulness of the analysis that the Department's trying to do given that, you know, the usual -- just comparing this to what I would consider this to be the usual course of business when something is sexy and exciting and Congress

wants to throw a bunch of money at it, and the money gets thrown, and the analysis is not really part of the picture. I appreciate that the Department is trying very hard here to thoughtfully analyze and test a lot of different options.

And I'm going to echo again something Mike Weedall said about the consumer behavior part. If the consumer behavior analysis was not part of this, it would be a huge deficit. So, you know, I've seen the results of early pilots that show that benefits delivered to the system or to consumers vary so enormously according to the nature of the technology, the nature of the rate design, the nature of the education they get, that when people just sort of talk roughly about the technology as a former regulator, certainly I just go -- you know, essentially, "Give me a break. Let's talk about something specific."

So that leads to my questions actually. So the first is I want to encourage and support

the process that you describe here. Now I'm concerned.

(Laughter.)

These are five-year studies. I feel like we're in a world where -- in a lot of places people are rushing to deploy the technology, and we're just starting the studies to figure out in pilots, well-designed pilots, what in the heck's going to work. So it does just -- there's nothing perhaps for this Committee to do about that except it would be useful to inform regulators and utilities that are rushing to spend money that perhaps the well-designed research and getting some guidance ahead of time would be a good thing.

But that then leads to the question is the funding for the five-year study secured or three years from now are we going to find out that, well, we had to cut it off?

And related to that is a question really about good research design. It seems to me that a complete research design would try to be

testing not just the center of a bell-shaped curve of benefits, but also, you've want to do some sensitivity analysis on what might be the possible tales of effectiveness. And, you know, maybe randomly we're going to get failures, and we'll get tales where there's really, really smashing success or really, really that didn't work at all, just randomly.

But it's also worth asking the question as a matter of research design are we prepared to accept that there is a form of goodness in learning that something doesn't work as a -- and are we willing to accept that as part of the research design in testing 70 different things? That's it. Thank you.

MR. BUTLER: Guido?

MR. BARTELS: Thanks, Fred. By the way, great comments, and one thing I also wanted to mention is on the communications part, exactly the point Lauren made and Richard reinforced. I was talking with some people before the meeting. And sometimes you wonder whether all the

attention we ask for Smart Grid and is now firing back a little bit.

I mentioned an early description. I was in a meeting with a company in Canada who made this point. They said we are not using the word Smart Grid at all any more when we meet with the regulator because when we use the word Smart Grid, all alarm bells go off, right? I think that's what Lauren was trying to say. So I think the communications part, Joe, is really important. And I think we have had some good support on several items on communication. So I think we really need to leverage some of the good communications capability we have. I'm referring to the early introduction to Smart Grid book, I think was a really good piece of work.

The other thing on the stakeholders -- and I think the Smart Grid Consumer Collaborative, Joe, would be a good organization to leverage if you're familiar with them. Otherwise, I can bring you up to date, but that's an organization specifically focusing on that

consumer behavior and looking at a little of the research which is out there and what we can leverage, et cetera.

And then, Richard, on your point about speed, I also had the same feeling when I see five years, right? And so the question would be -- I think it's a very good piece of work. And you almost do a parallel track, right, where you say, okay, do a very sound piece of work which we allow to -- for some more time, but are there -- what kind of proof points are there today already in the market from where utilities and regulators clearly see the value being there, and which is already perhaps well documented, and that we start using those cases more in our communication.

MR. BUTLER: Okay. Thanks.

MR. BOWEN: Yeah, I guess -- I guess kind of building on a little bit of what I've heard here, particularly from my colleague Mr. Bartels around the efficiency of things and how we do our businesses, why don't we just say from the world

of someone who's associated with a significant research and development group Alcoa, I know that we -- because I look at a list like this and it's like wow. You know, it's overwhelming.

I think what we tend to do is we high grade. We very quickly high grade to a list that we can actually get accomplished and make the most about a value contribution. And so I guess as I kind of looked through the list, I know you guys have got to do that. There's a lot of people who are throwing grenades -- I call them grenades -- over the wall saying, "Well, have you looked at this? Well, have you looked at this?" And I think part of the problem the Department, and I guess that the Committee here in general has got to do is it's got to weed that down to what are the things that are really going to provide us in the short, medium, and long term, if you will, benefit to the overall system, but where is that? You know, can we define it either in a quality of life, or in consumer dollars, or, you know, whatever it is, or safety and security

of the system I might add. And being a former member of the Reliability Councils and stuff, I tend to favor, you know, synchrophasors and things of that nature only because I've seen or most of us that have been a part of the grid have seen what's happened when you don't have control or you lose control. And I think most of us also see -- particularly guys like José and myself who have been part of the grid system knowing that the infrastructure is getting old, right? And the unknown that we face in the U.S. today of how to expend capital dollars on the grid systems -- and I speak to the utilities and the MISOs, NYISOs of the world -- it causes us to pull back or not spend as much as we could on the infrastructure, which means all the importance of the tools in order to manage that system. So I would tend to favor grid management tools, you know, the things like that that would actually keep it up because a single system outage in cost of dollars to me, you know, as someone who requires electricity to run the plants --

significant electricity to run the plants -- is enormous and will dwarf the benefit you get from some of these other things, I guess.

So, again, I guess, narrowing of, you know, what it is that you're trying to accomplish, high grading of the list, I mean, I think it's very difficult to do in the job but particular that DOE has because they do have so many grenade lobbers. And to take something off the list, somebody's not going to be happy, right? But I think it would be more effective and more efficient for the organization and the Committee, I guess I would even say, to be able to focus very quickly on a handful and say, "These are really the major impactful things. And here's the criteria we used to develop that." You know, so that you don't just -- it was kind of back to where he was in earlier years. You do a bunch of studies. You put them out there. They sit on the shelf and, well, what happened, right? And so I think if you can give something in a smaller package that people can grab a hold

of and then go work, maybe it's more efficient. I don't know. Maybe I'm -- maybe I'm dreaming, but let me dream for a minute, you know, that's how --

MR. CURRY: Maybe to belabor the obvious, but to the extent that we can give our impermater [phonetic] to that kind of choice, it can help folks at DOE withstand criticism from the grenade lobbers. And so, if we are comfortable as a group taking that kind of perspective, then we can interpose ourselves -- I'll volunteer -- between grenade lobbers and those who have to catch them once in a while.

MR. BUTLER: Dian and then Mike.

MS. GRUENEICH: First of all, I think this is excellent work, that it really is putting some solid technical parameters around all of the Smart Grid hype that we deal with constantly.

Four quick comments starting with what had been the last comment of how do we integrate it with the core. I don't know if there's funding or ability, but to the extent that there

is -- and it's not just the DOE are in (unintelligible) but to the extent that there are other projects out there that are -- quote -- Smart Grid that are not subject to ARRA funding but could be included within some of this analysis, that would be a benefit especially those that have gotten started. I mean, in California, you know, we've pumped millions of dollars into projects that are not necessarily linked to ARRA funding and getting sort of that within this rubric would be useful. That's subject to funding.

A second item is on the behavior change, I would be very interested in whether you're analyzing whether any of the programs or projects are leaning not just to reduce bills, but are we actually driving energy efficiency retrofits? That's -- again, within California we have made an assumption that as customers are seeing this information and understanding the pricing, there will be a linkage to some of the energy efficiency programs, and that will drive then the

longer-standing deep retrofits. And so I'd like it if there is something there that is trying to understand that part of it because that is where we really see the big bang for the buck is getting these retrofits done.

A third area is what I want to echo which is with all of, you know, this detailed chart out of it having some sense of the priority of the benefits. Not every benefit is equal. And as you're getting your results, I think that's going to be very important to understand which of these benefits really do seem to matter and which ones are nice, but certainly they're not top priority because, again, that's going to drive future funding and future efforts in these areas. Thanks.

MR. BUTLER: Okay. Thanks.

MR. HEYECK: I guess I'm going to join Dave Nevius as a -- one of those folks that personally knew Thomas Edison.

(Laughter.)

MR. HEYECK: Yeah, some of the

technologies have been around for a long time, so what's new about them? And I guess what's new would be better deployment.

On the customer side we need to recognize that this country is largely rural. And if we do a consumer study, I would hope that it includes all consumers, those that want Smart Meters, those that are indifferent to Smart Meters, and those that don't want Smart Meters because I think in some areas of the country I think you need a police officer to install it.

It's a -- there is a backlash out there on Smart Grid. So I agree with Lauren. Probably the dumbest thing we did was label Smart Grid as a -- in the lexicon. But I believe in the achievements of efficiency and so on.

When you look at the consumer, I would like to make sure that we do it in a space that not only includes the economic times we're in now but in the economic times that include income growth. I do believe that -- I still believe the comment I made last time that, you know, when we

made light beer that people actually drank more beer. We have more TV sets. We have more things to plug in because we want comfort. We'll worry about price if our income level is down. So we need to recognize that.

But if you ask the consumer what they really want, they don't want any power outages. I mean, this is the most fundamental thing. They don't want any power outages. And if there is a power outage, they want to know -- they don't want to call somebody up and get on a -- and if they do call somebody, they want to know when they're coming back. Is it two minutes, two hours, or two days? So there's a very fundamental issue that we need to address with customers.

The last category I wanted to get into is synchrophasors. And we actually were talking about this before the PC was born. And it -- it's not the deployment of the devices. It's what do you do with the data.

And actually if you -- in EPRI what we're

trying to do is bridge that last mile between deploying all these things and visualization. And then take visualization to a closed loop process of if you do detect a problem, it's really simple in order -- really simple things that you can do to avoid inter area oscillations. So what do you do with the synchrophasor data?

The greatest impediment to synchrophasors is if they advance and they become part of the control loop. Then we have to make them cyber secure. That's the greatest impediment.

MR. BUTLER: David?

MR. MOHRE: Actually, Michael, I think you, Nevius, and I installed the generator at Pearl Street Station together, but I might be wrong on that.

I just want to publicly say that we at NRECA and our co-op members really appreciate DOE's approach here. And, Joe, we've talked a lot, and I have to say the whole focus of information and analysis tools to local decision makers from our standpoint is spot on. It

couldn't be more spot on.

We particularly like your approach that deals as much with system benefits because it's been our belief that over the last two or three years grid benefits, system benefits. So bidirectional communication and control have been lost in the policy discussions. And yet, particularly the cooperatives who have very low density systems, that's where the benefits are. And that's why, as FERC pointed out recently, we're kind of the head of the industry because the benefits are so much more clear to us, it's easier to do it. So, it's easier to make a decision.

So I'm just saying thank you. Thank you for the communications back and forth, and thank you for focusing where we think you should be focused.

MR. BUTLER: Thank you. Gordon, and then we'll go to Joe and -- for any comment back.

MR. van WELIE: So, I have just two quick thoughts triggered by Rick and Lauren about

getting away from the Smart Grid and focusing on things that give us the best bang for the buck.

It strikes me that the biggest culprit in terms of cost on the system is air conditioning. So this issues of -- so I wanted to hear whether there's a linkage between the Smart Grid discussion and the storage discussion because if you can solve the cooling problem on peak, you can make a massive difference in how much infrastructure you have to put out there. You make a massive difference in air emissions and so forth. And so, if you can solve just that one problem, there's an enormous payback.

The other one that occurs to me is losses in the system, you know, from the generator all the way through to the end customer. So, that's more instinctive. I think in the first one I'm sure of that one. The other one I'm reasonably confident it will be number two.

But those, to me, seem to be the number one and number two areas that one could focus on in terms of reducing costs. And if you can --

that sort of focus and those linkages between Smart Grid and storage, that might help us a lot.

MR. BUTLER: Okay. Do we have another couple of minutes, Mr. Chairman?

MR. COWART: Yes.

MR. BUTLER: Okay. Joe, just a few comments in response?

MR. PALADINO: Okay. Thank you. I'll be very, very brief.

I really appreciate those comments. Let me just respond very briefly to a couple of them, and we can always follow up if you want to.

` We're working with a base R and D program also. One of the metrics that we're really looking hard at is overall system efficiency, energy efficiency. And hopefully, the Smart Grid program of DOE will translate into really improving overall system efficiency potentially and being able to measure that.

The other comment I'd like to say -- and I'm going to go back to this slide -- is you're right. We have a lot of benefit streams here.

And so one of the things that we've asked ourselves -- and I'm glad you brought it up -- is where do we really focus.

And I think where we're focusing is no the right-hand column that where it says, "Results." So if we can be as meticulous as possible with respect to gathering data and looking at the effect of this technology on those items and do a good job at that, I think we've done a pretty good job. But if you've got any other thoughts about that, it would be appreciated.

I think -- I think that's probably all I have for now unless you want to pursue anything.

MS. HOFFMAN: Well, can I just add a couple things? The consumer behavior studies are funded through the ARRA grants, so they are fully funded, so there is no concert there with respect to funding issues.

The other thing is I know that there was a discussion of five years is a long time, but we are going to be collecting information as we go.

Joe mentioned the reporting. And as we report, we're going to crunch and look at some of the benefits analysis. So we're going to hope that we can actually be able to report some of the benefits as we go, as the projects develop, so we actually can provide some direct feedback into it and -- as a lesson learned.

And then the final comment that I would like to add is we do have a Smart Grid System Report. And maybe that's something as well the Committee should look at for strategic direction, guidance, and saying, "Okay. Are we doing that or providing any -- how can we add more value to that?"

MR. BUTLER: On that subject let me encourage the members of this committee who are still full-fledged members of NARUC to encourage the organization to get some of this information out as it's gathered as we go along because that gets to the point about making it relevant to today and what's being done out in the states today.

And Lauren has put her finger on it. If commissioners had some of this information, then Smart Grid may not be as damaged a brand as it seems to be.

MR. PALADINO: Right. That's an excellent comment. We will try our best to figure out what information we can get out there as rapidly as possible.

MR. CURRY: And feel free back to Barry, myself, even ex presidents have some --

(Laughter.)

MR. CURRY: -- NARUC.

MR. PALADINO: Thank you.

MR. BUTLER: Okay. I want to remind you that the second purpose of this report was to get some other ideas from you. If there are anyone -- anyone has any ideas that they want to share right now, if not, please get in touch with me or someone.

MR. COWART: I just have one comment to link this conversation to the one we had a little while ago about storage.

Perhaps it's embedded in your blue box there of results, but one of the -- when we were talking about storage a few minutes ago, you'll recall that we were looking forward to a grid where there is likely to be a lot more variable generation and the potential for a lot more electric vehicles being plugged into it which creates either a wonderful opportunity or a big problem, depending on how that's managed.

And it -- in other presentations like this I've seen that one of the important results is essentially creating the capability on the grid to handle the integration of a greater percentage of variable generation and a greater percentage of electric vehicles. And maybe that's, you know, embedded in the phrase grid reliability or environmental benefits or, you know, you already have it in mind, but being explicit about anticipating that change in the power supply mix and also in the demand mix seems to me to be an important goal for all of this.

MR. BUTLER: Joe, let me just add on --

kind of on that point.

That blue box, the dark blue box on the right, it doesn't seem like there's a follow through on the customer empowerment. Now I know that some of those items are going to be helpful to customer empowerment. But if I'm a consumer or if I'm a consumer group and I look at that blue box, these are the priority benefits, results? I don't see anything that gets me terribly excited. So maybe if you can reword one or two of them or add one that talks about customers' control of their energy usage and maybe bill reduction, which gets their attention, which is important and happens --

MR. PALADRINO: Fred, we will do that. We'll rearrange it so that that's more explicit. And we do have focus areas, so maybe I should turn this into what are our analytical focus areas.

MR. COWART: Great. Thank you, Fred and Joe and the Committee.

It's time to take a break. And I think

we've got -- what is it? A half hour or -- we had -- so why don't we come back at 11:15 and take up the next topic. Thank you very much.

(Brief recess.)

MR. COWART: Thanks. We have a couple of follow-up items, quick follow-up items from this morning's conversation. And the first deals with the Storage Subcommittee's report. As mentioned earlier there is a statutory obligation to create a report from the Storage Subcommittee in the near term. And we are close to the finish line on that, and so I'd like to ask Ralph to comment on how he would like to proceed.

MR. MASIELLO: Our idea was that the report Brad presented fulfilled the obligation of what's happening. And the policy points can be revised to reflect this -- today's discussion circulated -- we'll get it back out tomorrow to you, Richard.

And those two things could form an interim report with a plan to go back and readdress the R and D needs identified in the

2009 report and -- against the here's what's happening and see if there are any other R and D needs that can be identified such as analytical tools for assessment, et cetera, is discussed, but premature to say that we can put that in the report today.

MR. COWART: Okay. Thank you. Let me just ask David Meyer does this work from the Department's point of view?

MR. MEYER: I think this is -- this concept will work just fine. It -- but I want people to understand very clearly how some of this is going to have to work. That is ideally, this group would -- the full committee -- let me back up a notch.

The Subcommittees -- their reports have to be -- have to have the stamp from the full committee in order to satisfy Federal Advisory Committee Act requirements. And so that's easy to do if a subcommittee comes forward, puts a report on a table at a meeting, it's discussed, and then at the end of that discussion the full

committee says, "Fine. Done." That's not possible here, so we're going to have to manage this electronically. And I think that's quite manageable, but people just to have to understand that's how this is going to work for this particular item anyway.

MR. COWART: Okay. So -- just so everybody understands, Ralph will be writing up the results of our conversation today, appending that to the report that Brad has already created, and then we will then create a final document which will be circulated to everybody, and we will ask for your approval of that document as the report of the committee. And that's going to happen very soon.

MR. MASIELLO: Yeah, we'll get -- we'll get it back out end of the day tomorrow.

And then there is another element to it which is I asked David if DOE could review Brad's report for correctness that -- in case we overlooked and ARPA-E project or misstated something. There's no sense putting bad data out

there.

MR. COWART: All right. Anything more on this because we need to return then to this Smart Grid Subcommittee and -- Fred?

MR. BUTLER: It was pointed out that we really didn't end with the articulation of exactly what the Smart Grid Subcommittee is doing with regard to Joe Paladino's project in the report. And I just want to make it clear that what the Subcommittee is doing is reviewing the progress and making suggestions, as there were a number of suggestions made today, which I have written down and Joe's written down, and we'll meet on those afterwards going forward as to how things might be improved, directions might be slightly altered and perhaps some more new things might be added if possible as the project goes forward and then some reporting suggestions as to how we can make the data that's gathered more helpful in the short term to the decision makers out there.

So that is the approach that we're going

to be taking. And I also think that argues for a return by Joe at some point in time. And, Joe, you can comment on -- is this six months that you can come back and tell us where you are and what's been reported and what's being uploaded to the website? And then we could work on how to get it disseminated better.

MR. PALADINO: Six months (inaudible).

MR. BUTLER: Okay. So maybe not the next meeting but the next meeting we'll have a report. Okay? That's it, Mr. Chairman.

MR. COWART: All right. Anything further on Smart Grid's recommendations to the Committee? Yes, Richard?

MR. VAGUE: (Inaudible).

MR. COWART: Mike.

MR. VAGUE: I'm relatively new to the industry, and I think it's very interesting to note how different the innovation model is for Smart Grid in this industry versus other industries noted for innovation, like the internet industry or the telecommunications

industry. And I've been to seminars where I've seen utilities present some of their pilot programs for consumer Smart Grid systems and it's -- you know, I've spent my career in consumer marketing outside of a heavily regulated industry. And it was very clear that many of the pilot programs that were established were never going to work. And yet a lot of time and money was spent on these programs, and then a conclusion was reached that seemed to me to not necessarily relate to anything of value in terms of understanding the way consumers really behave.

And I think, you know, what you have in this industry is a very centralized situation with a lot of regulation and very little private capital as contrasted against telecommunications or internet industries where you have an extremely decentralized approach with very little regulation and almost complete participation of private capital.

And I think a comment was made somewhere along the line that, you know, I want -- it was

in essence innovation has to be approved in advance by a regulatory body. And it's hard to envision that we'd have an iPhone or an iPad if Steve Jobs had to go ask permission.

And it's also very uncharacteristic of those industries, internet and -- to have multiple-year studies with a hundred characteristics. That's kind of not the way it's done. The cycles are months or, you know, certainly no more than a year. And it's a lot fewer than a hundred characteristics that are deemed to be the important ones.

You know, for example, consumer response is one characteristic, which dwarfs, you know, lots of others. So I don't mean to suggest that anything being done here is not of value. It's probably of enormous value, but I'm not sure a model where you have to go ask a regulator for permission is one where rapid innovation is going to occur.

MR. COWART: That has been observed a few times.

(Laughter.)

MR. BUTLER: It should be pointed out that Steve Jobs does not have a monopoly granted by the government to make money or to do business in a certain space.

MR. VAGUE: Well, you know, perhaps that's the most important thing to note and perhaps it's an indictment.

MR. COWART: Yeah, on that imponderable, I guess I would say, we'll have to move ahead. Mike?

MR. WEEDALL: I mean, this'll get me going. And how do I work for the abominable power administration? Never mind.

But I think one of the things that certainly we haven't talked about today but, you know, to me is definitely going to be emerging -- you know, it's already starting to emerge on the demand side. There's not going to be a whole new set of players coming in. And some of the barriers, you know, that you're talking about, Richard, you know, we're going to get swept along

with them. And I think it's important, and I don't know exactly where, you know, in our work this might, you know, fit, but, you know, we need to have it on our radar screen that when Google comes in, you know, as I tell general managers throughout the Northwest, and, you know, their customers download an app and it tells them that their bill is $127, not, you know, $137. It's the utility's problem. It's not Google's problem. And, you know, that's just one instance of many.

So I think it's -- you know, it's important to, you know, keep that on a -- I don't know where it fits, Rich.

MR. COWART: Mike.

MR. HEYECK: I like thinking about imponderables. I think the boundary line -- if you think about what as said this morning about energy storage, the boundary line is we still need highways, rail, and we still need the infrastructure. So where is the line between the public good, the infrastructure, and the private

innovation?

What we want to do is make sure we reduce impediments to allowing them to occur. And right now the gateway is that Smart Meter. It's that point where does that really bridge the gap in the cloud between the private innovation and -- but I think for us if we look at ourselves as looking at the energy infrastructure and making sure the impediments are reduced to allowing private innovation, I think that's where the crumb is.

MR. COWART: Turn this conversation off. Tom.

MR. SLOAN: You know, I sit here and I really like the idea of, you know, of having an app for that. But when all gets said and done, reliability is still the key. And, you know, all carry cell phones that are smart, or dumb, or, you know, somewhere in between. And we've all had calls dropped. We've all had, you know, areas where there is no service. I sure don't want to have to go to my voters and explain that,

you know, we've got a really sexy app for you to measure you electricity use, but it's only going to be available -- the electricity is only going to be available for 22½ hours a day. I mean, somehow we can't lose sight of the reliability component.

MR. COWART: All right. Let's let this be the last comment on this one.

MR. VAGUE: Reliability is what you always hear. And I'm not sure ultimately it's stands the test particularly as we live in a world where -- I mean, if you want to -- I haven't had particularly reliable electric service over the last week in my community.

And the biggest issue for the businesses that I'm around has been the loss of internet and telecommunications. So I think -- I'm not sure reliability ultimately is done a disservice by decentralization. It may be enhanced.

(Comment by Mr. Delgado off microphone was inaudible and not transcribed.)

MR. COWART: I think this is a

conversation that we should continue over lunch, at dinner, whatever.

UNIDENTIFIED FEMALE: In a bar.

MR. COWART: Yeah, right. That's it. It's a great conversation, and, you know, those of us who are veterans of the whole restructuring, you know, movement --

(Laughter.)

MR. COWART: -- have some appreciation for, you know, the arguments on both sides of this one.

I used to bring a black old rotary dial telephone to the Committee Hearings and stick it on the table, you know, and say to legislators, you know, if we hadn't allowed competition in end-use devices, this is what we'd still be using and just to make that point.

On the other hand, obviously along with the other people from the industry and the regulatory community here, the imperatives for reliability really do drive hugely what we -- a lot of our decisions, including about

competition.

(Comment by Mr. Delgado off microphone was inaudible and not transcribed.)

(Laughter.)

MR. DELGADO: You know, the other thing is -- this is an industry driven by policy, by public policy. We're implementers of public policy. If you forget that, you realize that then you're missing the whole point. There's a lot of stuff we're talking about that if there wasn't some state policy demanding a certain amount of renewable, we wouldn't be talking about it because economically it wouldn't make it.

But they're making it because it's a state policy to do so. There's no federal policy, okay. The federal government has been unable to do it, but there's 50 states setting up policy on leading environmental. Good, bad, or indifferent, remember, they have the right to do it and we are the implementers of it.

So we have -- there is a very different driver for doing it. And by the way, that is

embedded in law. So you like it, don't like it, but that is the fact. That's what it is. And it would not be appropriate for a utility to decide policy because then you'd be taking authority or something that belongs to the people -- and as -- as represented by regulators.

So from that perspective it is a very different mindset of what we're doing versus what, in fact, IBM or Apple is doing. It's -- it's a lot of fund, and it's made a lot of money, and has done tremendous amount of service for everybody. But remember, we're implementers of policy. If you lose that, then you lose the guts of it. That's in law.

MR. COWART: Like I said, this is a great conversation. And it is worth noting that a lot of advancements in grid technology and in the distribution of Smart Grid, Smart Meters, controllable load, electric vehicles, you know, that whole list of things actually is implicated here. So, clearly something we can all talk about as we go forward.

Fred, we're -- I think we were done with the Smart Grid Subcommittee Report. The third Subcommittee -- or actually, not a subcommittee but a working group report deals with the topic that we opened up last time with respect to the current suite of pending EPA regulations under the Clean Air Act and Clean Water Act and the potential impacts on reliability associated with that. And in -- the Committee heard from EPA about the regulations that are pending. We also -- we heard from some others about anticipated impacts of those regulations and concerns about -- potential concerns about reliability and tasked a small work group to go forward and to consider this question and to come up with recommendations for the Committee.

And I am now going to pass around a short report from that Subcommittee. Can you just take -- pass them?

(Mr. Paladino leaves the meeting.)

MR. COWART: To summarize the -- to summarize our discussions a little bit -- and

then I want to ask Pat Hoffman or David Meyer to talk about what's going on within the Department on this topic.

We discussed a range of possible responses to the challenge of reliability in the adoption of these new regulations and came up with two that we think deserve the endorsement by the full Committee.

Just give you a chance to -- I'll take you through this document very quickly. The first paragraph just describes the different rule makings that are underway. This is what we heard from Gina McCarthy at this -- in this room at our last meeting.

We also heard about various independent assessments that have been conducted on the potential impact of the rules, including from NERC, and from the industry, and from some -- form the Clean Energy Group there have been a number of such reports now. And we're making a clear point here that the EAC is not attempting to evaluate those reports or to conclude that

either there is a, you know, reliability challenge of a certain magnitude or a certain other magnitude in particular. And -- but we emphasize that reliability is paramount and that the Department should act in concert with FERC, NERC, and EPA to ensure that reliability is maintained, will be maintained as environmental regulations are implemented.

That leads us to two conclusions, two recommendations that the Secretary create a consultative process with EPA and FERC in which the three agencies agree to communicate on these issues. We're not trying to change the jurisdictional boundaries of EPA or of FERC as -- or of DOE as we make this recommendation but recognize that the agencies need to communicate closely to make sure that there will be procedures or processes for reliability issues to be addressed.

And then second, there is now a specific recommendation which we felt fairly strongly about which came up actually from Gordon van

Welie to our Subcommittee. And perhaps it's useful to just ask Gordon to explain that. Or do you want me to?

(Comment by Mr. van Welie off microphone was inaudible and not transcribed.)

MR. COWART: Okay. Well, the problem is in terms of anticipating the potential retirements that one -- that might flow from implementation of the EPA regulations. One problem for planning authorities -- and I'm told by David that we should be using the new term planning coordinators -- is that the plan -- those coordinators while being responsible for ensuring reliability, that reliability is maintained, are only really allowed to plan for the retirement of a unit after the owner of the unit informs the authority that there is a retirement really going to happen and that that creates a situation where right now, looking at the implementation of these environmental regs -- and frankly, other things, too, but let's just take the environmental regulations.

The planning authorities are unable, formally anyway, to reach out into the future and do scenario analysis to say, well, it really kind of looks realistic that this -- these units, and these units, and these units might be retired early because of the implementation of these regulations. And let's do some forward planning to anticipate that and to then give us some time to come up with responses, really assess whether a transmission, a new generation repowering, demand response, whatever it is, might be called for. That kind of -- let's -- I'm using the phrase scenario analysis because it's not predictive because the market participant hasn't actually said, "These are my intentions." No one's trying to force the market participants to do that. We're not trying to ask the planning coordinators to read the hearts and minds of the investors to figure out whether they're going to retrofit that unit or retire it. But still, reasonable people who know the characteristics and costs of these things can run scenarios.

Gordon's suggestion was that we recommend that FERC and the planning coordinators be encouraged by DOE to broaden that planning process so it can be more forward looking. And I'll invite additional words or amendments to what I just said.

MR. van WELIE: You did a great job actually. There's a step beyond that which I'm not sure we should take at this point, which is what one would do about the information that comes forward in these planning studies. And I think that's a very complicated discussion which is better left for the FERC and the planning coordinators, authorities, and operators of the system to go and work through.

But I think what this does is at least allows to get good information on the table to figure out what we want to do.

MS. HOFFMAN: And I think part of that as the key is to get that information on the table because we have to look at the intersection between the markets, reliability, and

environmental protection as well as cost. And so, how do you make educated decisions when variables are changing and there's not a -- and there's a certain level of unknown in the process?

MR. COWART: I know I have comments from other members of the Subcommittee who are active on this, so let's start here, David.

MR. NEVIUS: Yeah, just one very specific thing. In the second paragraph, the second line, it says, "On the continued operation of the nation's fossil generation fleet." Well, that's accurate with respect to all the Clean Air regs. 316(b) can vary significantly affect nuclear units that do not have cooling towers.

MR. COWART: Very good point. Did you -- you got that?

MS. HOFFMAN: Uh-huh.

MR. COWART: Okay. Good.

Just coming back -- well, let me hear from the Subcommittee first. Michael?

MR. HEYECK: Just one of the -- the

criteria used by most planning authorities is a deterministic criteria that's supposed to encounter all outcomes or at least outcomes that are probable. The new planning standards that are going to come out probably in 2012 actually for NERC reliability standards do include the fact that you have to incorporated sensitivities regarding the model that you're using. Sensitivities around (unintelligible), demand response, generators at risk, new generation, offshore, onshore, so on and so forth.

But let's be clear that we're not trying to predict an exact outcome. So the plant that happens to be on the river here, we estimate will be 82 percent probable of being retired as not exactly what we're trying to get. It's really the sensitivities around it which I think NERC has been forward looking with their TPL-2 standards I believe it is for planning.

So just to be clear, no one has to say that Acme Unit Number 1 is going to be retired by 2012. The problem with the criteria today is --

just evidenced by the Path Project that was put under suspension -- we've -- it's been studied for five years. And every year has a different date, 12, 13, 14, 15, unclear, now really unclear. And we don't know what the date is going to be, so the Planning Authority has to determine with some authority what it is that -- if this line is needed and when it's needed to the point where the state regulator actually buys it because we actually are going to use land.

So let's be clear, the Planning Authority needs guidance, but we don't need to get the micrometer out to determine the exact scenario.

MR. COWART: Thank you. Joe.

MR. KELLIHER: I just had a question or two for Gordon, but how far in advance in ISO New England do you get an official notification of an intent to retire?

MR. van WELIE: Well, actually, since we informed the four capacity markets several years ago, we now get as much as three years' notice.

MR. KELLIHER: Okay.

MR. van WELIE: Prior to that we didn't even get that much notice. So -- but, of course, you're doing a 10-year -- your -- the reliability studies that you're doing in terms of transmission planning are a 10-year horizon, so there is a disconnect there. And so, whereas, you know, we are facing a specific problem in New England, just for the rest of the group, where about a quarter of our fleet is oil-fired generation that was built in the '50's, '60's, and '70's, and actually, they're being pushed out of the market more to do with economics of gas versus oil than anything else. But the EPA regs are going to accelerate that process.

So our guestimate at this point is that within the next five -- and on the outside -- and 10 years, that fleet -- that portion of the fleet is gone. Some of those units will be -- we'll be able to let retire without any consequence because we've already made the transmission investments. Some portion of that fleet is going to create a range of different reliability

problems would have to be resolved.

One of the criticisms that's come forward with respect to our planning process is that we don't signal that retirement need through our marketplace in any way other than the four capacity market mechanisms that I've mentioned.

And so, for regulators looking at that, they say, well, you know, wish you had told us sooner because we would have done something about energy efficiency, or DR, or done something to get some alternative resource sited, and, you know, it seems like the only thing you can solve the problem with is a transmission line. So, the question of how to then solve the problem is much more complicated because it affects wholesale market design, and it affects the planning processes, et cetera.

I guess my thought here was just to get a sense and start educating people on what the implications are of retirements of large portions of the fleet. And then I think each region is going to have to go figure out with appropriate

guidance from the FERC as to how to go solve that problem.

MS. HOFFMAN: And if I can add something there, it goes off of building the time requirements for whether you're replacing it or you're building a transmission line, or implementing a demand response is how are we syncing up all those time requirements as we look at --

MR. KELLIHER: Sure, but the three-year window for notification of retirement with respect to the (unintelligible) market doesn't limit your ability to plan beyond that, not in a unit-specific sense, but you can plan in 10 years from now X amount of --

MR. van WELIE: Right.

MR. KELLIHER: -- oil-fired capacity we think might be retired, or X to Y might be retired. I'm just trying to see how --

MR. van WELIE: You can -- yes, I think the -- the -- it's an evolving discussion. So I think technically there's nothing really

preventing us from doing the kind of sensitivity analysis that Mike has referred to, and, in fact, NERC is already heading in that direction.

The question ultimately becomes down to whether on -- in the end whether we want to create some requirement to be doing that because the problem is dealing with the problem has lead times of five, to six, to seven years associated with it. And a unit owner can hang on until essentially the last minute and then say, "I'm gone." And at that point you're scrambling to solve and, you know, the problem, and it might be expensive or less efficient than had you been given more lead time.

How one reconciles the -- sort of the choice inherent in the market for somebody to continue to operate while you simultaneously are planning for that resource to not be there, is not something we have a solution for today.

Why we are particularly concerned in New England is that we see that this is going to play out fairly quickly in a fairly short period of

time. From anecdotal information that I've seen, and read, and spoken to people in the Mid-Atlantic area, there are many smaller coal units that have similar issues. So, where the owners of those units are going to look at it and say does it make economic sense for me to make the investment given these EPA regs that are coming at me.

So I think what's playing out in New England may be sort of a precursor to what may play out on a larger scale elsewhere. And I think NERC took the first step in terms of sort of quantifying -- doing a sensitivity analysis on more and less extreme versions of the EPA regulations and what that might mean in terms of capacity margins in aggregate, but there's another level of detail below that which is what does that mean in terms of the specific localized reliability problems that get created when you retire those -- those resources.

So, you know, to Mike's point, you're not going to want to get the micrometer out, but you

do need to understand where your problems are going to come from, and broadly speaking, what the solutions might look like to solve those problems.

MR. KRAPELS: There is a potential -- I totally agree with Gordon -- a game of chicken that takes place between retiring generators and states on this issue of when am I going to retire and the state's need to do something. And beneath the surface of this discussion is the problem of the capacity market design and the willingness of investors to come in and build generation based on the capacity market design that we have in New England, and New York, and PJM, and California. This is a huge issue that the Committee hasn't discussed yet.

What you see in this game of chicken is the states blink, and you have, for example, in New Jersey, Maryland, New York, and other states looking at procurement of capacity through an RFP process that makes this whole discussion even more complicated, but the worry and the concern

about generators deciding at the last minute to retire, and they're not being a sure response from the marketplace is a part of the problem.

MR. POPOWSKY: You know, I start with a rhetorical question which is -- maybe it's rhetorical. Are we talking about reliability, or are we talking about generation adequacy?

I remember I was on the NERC board, and it was pretty clear that NERC did not have authority to establish rules for generation adequacy, you know, reserve requirements. I don't know if that's changed since then, but --

MR. NEVIUS: The legislation actually says NERC with the ERO cannot establish standards. Neither FERC nor NERC can establish standards that require the addition or the expansion of generation or transmission.

However, we do have standards that dictate the study and reporting of results which is what we're doing.

MR. POPOWSKY: Right, and that's what I was going to get to because I was also at work

with Dave on that committee when we drafted the legislation at NERC. There was a provision that was presented at the time that would have given NERC and FERC a generation jurisdiction, and it was roundly denounced and rejected.

So, I guess it's sort of curious that we're not talking about -- in this document we're talking about NERC, and FERC, and DOE but not the states because it seems to me that to the extent anybody has jurisdiction over generation adequacy, it's the states. And so, you know, PJM can plan. They can encourage generators to stay on line. They certainly can't order new generation. FERC cannot, as far as I can tell, order new generation.

But I think in states like Wisconsin, and Kansas, and even Vermont, I guess, the states are still where this is being decided.

MS. AZAR: Thank you for that introduction. Two different things: I think -- this is one of the things that keeps me up at night, and, in fact, at my urging we opened up a

retirement generic docket in Wisconsin to try to deal with this issue.

I've got a couple thoughts. First, how this unfolds in regulated versus unregulated states is entirely different. I can tell you in unregulated states they've got even worse problems than we do in Wisconsin, but with regards to this docket we opened up, it's one of the many reasons I have a bull's eye on my back because the utilities do not want to talk about this.

So, I think when we're thinking about it and I don't know what more we're going to be doing besides what's in this report, but we really do need to unpack the unregulated problems versus the regulated problems. The regulators, we can get information, and we can predict, I think, a lot better than unregulated states as to what's going to be retired. But I can tell you we need some education with the utilities on why it's important to do that.

And I'm going to be a contrarian with

regards to we don't need to be plant specific. Given the rapidity within which we will be retiring plants in this nation, first of all, I mean, Gordon has just mentioned this has nothing to do with EPA regs. This just has to do with, you know, the aging infrastructure.

The need to get a handle on specifically what plants are going down in order to figure out how the transmission grid is going to be working -- I just think we're naïve if we think we're not going to have to identify specific plants.

And I also want to recognize from a competitive standpoint, it's nearly impossible to do that. And so, that's what I've been struggling with in Wisconsin is we've got -- you know, my utilities are saying to me, well, I'm not going to tell you which plants I'm going to retire because, you know, I want to be able to hedge this.

And by the same token, as a regulator, I need to keep the lights on, and I know that plants are going to be retired. And, you know,

working ATC to try to figure out how to build up the grid and where the grid needs to be built up, we need to know where those plants are going down. So, I think it's naïve to say we don't need to drill down. I think we need to drill down now is the bottom line.

MR. COWART: Thank you. This looks like a lively discussion, and we still have cards up, so we're going to have to return to this after our speaker and lunch break, which I'm happy to do. But let's make -- let's now turn it over to Pat and you're going to introduce the Under Secretary?

MS. HOFFMAN: Thank you, Rich. What I'd like to do is actually introduce Under Secretary Koonin. Dr. Koonin was nominated or confirmed as Under Secretary in 2009. He actually brings great insight to the Department because he has had positions that have been a university professor and an administrator at California Institute of Technology as well as he has experience in the private sector being the Chief

Scientist at BP. So what he does is brings a great balance between the science and the technology and applied side.

He's also served on numerous advisory committees from the Department of Energy, the National Science Foundation, Department of Defense, and as a Fellow of the American Physical Society. So what he also can bring is very insight on the value that advisory committees can bring to the Department and other entities in providing strategic leadership to the nation.

So I'd like to welcome Dr. Koonin and really say I appreciate you coming here today.

DR. KOONIN: Thanks, Pat. Can you hear me without a microphone? Is that all right? Use my teaching voice. You need to record it. Yeah, all right. I'm stuck behind the podium then. That's fine.

Thanks. I gather I'm the last thing before lunch, so I'll try to be lively, and brief, and maybe get some discussion going.

The Department of Energy is about energy,

but it also has several other missions: nuclear security, basic research, environmental management, but energy is probably the thing that's foremost on the administration's mind and the public's mind during the last year or now.

To drill down even further, let me assure you that power and the grid are also much on my mind. On Tuesday I spent a whole afternoon with the folks from Cal PUC, Cal ISO, and the three big utilities on a fascinating discussion about what DOE assets could be brought to the prediction of grid with the uncertainties associated with it as well as the real time management. And I believe there are substantial assets in the Department in the national laboratories that can be brought to bear on some of the problems you were just discussing.

I want to talk broader picture for a minute in part because we're increasingly out and about trying to talk to the public about what an analytic energy strategy would look like for the nation. And we've started to talk about the

energy challenges that the country faces in three buckets or three dimensions. One is associated with oil, our vulnerability to not only the price but the fluctuations in the price in the global oil market are coupling to that global activity, in fact, is causing us a lot of trouble at the moment, as you probably well know from reading the papers.

Less widely appreciated is the increasing concentration in the conventional reserves of oil that the world has in the hands of a few national oil companies. That blue wedge down at the bottom shows that better than three-quarters of the reserves are in the hands of Saudi Aramco, Pedevesa [phonetic], Petrobras, and so on. And only about 10 percent of the conventional reserves are accessible by the international oil companies like Shell, BP, Chevron, and so on. So, that is rendering us subject to the actions, and these days, the fates of countries that are not always so clear to us. So, oil is one.

The second challenge is environmental,

associated with increasing greenhouse gases in the atmosphere due to conventional use of fossil fuels and that's impact on the global climate. While there are perhaps some uncertainties about exactly what's going to happen, the growing concentrations are posing a risk that most people we, society, should not be taking long term.

And then finally there is the issue of U.S. competitiveness. We used to say that, well, let the commodity things go and be manufactured abroad, and we'll handle the high-tech things. Well, in fact, increasingly we see high-tech manufacturing going on in Asia, other parts of the world. This chart shows lithium ion battery production one percent in the U.S., most of it in Japan, China, South Korea.

Many other fields the electrical infrastructure that you-all purchase and operate, not manufactured here in the U.S. much anymore. We've got to deal with that.

And then with respect to competitiveness, also the financial situation of the government,

this shows the historic and projected trends in the federal deficit. You can see that we've had a real regime change in the last year or two and that looking out over the next decade we're going to be in the red significantly at the trillion dollar level each year.

And so these are all factors that touch on, more or less directly -- on the energy situation. And we've got to manage solutions to them that are timely, material, and economic all at the same time.

The administration has set goals to try to manage some of this greenhouse gas emissions from energy-related activities down by 17 percent by 2005. I think there's a good chance we will make that down by 80 some odd percent by the middle of the century.

And then on the oil front to reduce daily consumption by 3½ million barrels a day, just about 25 percent of what we use for transportation every day.

How are we going to get there? Let me

not go through the pretty pictures, but let me go through some words. We've been trying to get down on one chart everything a non-expert might need to know as we think about transforming the energy system. Let me go through that for you. Some of it I expect will be in your DNA, but others, as I discovered in the Tuesday discussion, might be somewhat interesting to you.

The first of all, energy as a whole is big and it's expensive, and it's a system. We have trillions of dollars of capital tied up in what we're using already, and it all needs to function together as you-all well know and were discussing.

The second most people forget is most of it is in private hands. And those of you who might be public or semi-public entities still behave like private entities in the sense of trying to deliver electricity at the lowest cost to your consumers.

So the government's role in direct deployment is pretty thin; however, the

government does govern things by the economic and regulatory playing field that it sets.

On the supply side which is fundamentally different that the demand side, the system is characterized by a few centralized assets together with a distribution system. Historically, change has required decades to have any material impact. The electrons that you produce and the few molecules that the oil companies produce are commodities. And that means that you're operating on thin margins. And as you think about new projects, technology is among the least of the levers that you perhaps can pull. Market conditions, operations, guaranteed off-take agreements, and so on are probably much bigger levers in ensuring the success of a project so technical innovation is not something that's first on everybody's minds these days.

The disjointness of the energy sector in terms of transport versus stationary is also something most people have not understood even in

the government that you will not fix the oil problem by building more nuclear power plants. Or even that the clean energy standard for power that we're talking about will not help with the oil supply issue, much as some of the political statements getting made imply.

As I mentioned, transport is about oil. Power, well, you-all know that better than I, so I'm not going to go through it.

On the demand side, it's a little bit different. The assets are in the hands of millions, hundreds of millions of different actors. They do not always have finance at the top of their list. For the consumers, it's personal preference. It's convenience. It's behavioral patterns and all of that determines what happens.

The turnover is much more rapid. Appliances, even automobiles last a lot shorter than power plants or transmission lines do. And as you-all well know, little attention has been given to system optimization in the power sector.

This is, I hope, a familiar depiction of the energy flow in the U.S. The point to take away without going through the details is the separation of petroleum on the bottom into transport and a little bit of industrial use, the exclusive use of coal for power and then the diversity of sources that feed power.

If you look at this and you understand some of the other things I talked to you about about the energy system, you realize that there are essentially six things we, as a country, need to do to address the energy problems. If we do them, we'll make progress. If we don't do them, we won't. And so keyed in with that graph on the supply side, we need to develop, deploy clean electricity sources, solar, wind, nuclear are perhaps the most important -- gas, as you probably all well know will be a bridge to the clean electricity future. The words roll off the tongue.

On the mobile side of supply, liquid hydrocarbons are not going away any time soon.

For heavy duty and even for light duty vehicles, it's hard to beat the energy density in liquid fuels. And so we've got to develop alternative sources. Advanced bio fuels are most prominent among them.

On the demand side efficiency -- 40 percent of energy used in buildings we can do a lot better with both retrofits and new build. Vehicle efficiency, there was a great article today -- I think New York Times or maybe Wash Post -- about how even conventional automobiles are now up at 40 miles per gallon with about a $1,000 or $1,500 price increment. A lot of head room in building more efficient conventional engines. And then somewhere in the middle, modernize the grid. I'm not going to say any more about that. You can lecture me on that. And electrification of the light-duty fleet progressively, a succession of hybrids. Most of the automobiles sold in 10 years will be hybrids. Plug-in hybrids -- we've just seen the Volt come on and eventually, perhaps, battery electric

vehicles.

I was fascinated by the discussion in California which is, in fact, a leader in electrification of the fleet. And at least the folks in PG&E were not so much worried about the absolute load that vehicle electrification would place on them but were more worried at the local level where everybody in Marin County or in Berkeley suddenly buys a plug-in and they've got problems with the local distributions system.

We have put out recently a strategic plan for the Department which is available for public comment. The strategies go in three buckets. It's always three. Deploy the technologies we've got right now. And you can see modernize the grid up there is prominent among the steps we're trying to achieve. Discover new solutions. We're putting in place research organizations like ARPA-E, the Energy Frontier Research Centers, the hubs to accelerate the motion from the laboratory out to material impact.

And then very importantly, I think, lead

the national conversation on energy. There is such misunderstanding and misinformation out there about energy that the more we can push sound techno-economic analyses the better policies we're going to get in the end.

We are announcing today -- and the e-mail will go out today, of course, because of this meeting -- no -- coincidentally, a kickoff of a quadrennial technology review that will be a foundation for an analytic framework balancing technology activities in the Department.

One of the principles by which would be -- should be constructing a portfolio. What technologies should be in? Which out? How do we manage the interface between the government and the private sector in demonstrating and deploying new technologies? Many people feel a national conversation long overdue, and this will be a start at that.

We will issue on Monday a framing document that lays out the energy context, the challenges, and poses some questions about DOE

programs. So I would urge you-all to have a look at that and respond. And then I would just note that we're committed to full outreach and transparency. Going through this we will not become the victim of faults that other energy strategies have fallen to. And there'll be numerous workshops and public comments, and focus groups, and so on. I expect some of you will play a role in all of that.

Let me not go through that, but simply say I welcome questions and comments on what I've told you this morning. Thanks much.

MS. HOFFMAN: All right. I open the floor for comments. Oh, come on.

MR. VAGUE: The one thing that seems like it's been a profound change over the last years, few years, has been the increase in natural gas that's commercially available. And even your first slide where you showed the dependency on foreign oil, and that equation feels very different today than it did three or four years ago because of the opportunity to use natural gas

as a substitute for oil in at least some cases.

That -- it just seems so structural that it -- I think the whole industry feels differently now.

DR. KOONIN: I would agree with you. We're seeing unconventional gas now, I think, at 15 percent of U.S. production. Gas imports have -- shrinking to zero. It is -- I don't want to sound too much like a methanophile, but it is, you know, quite a bit cleaner than coal. It's abundant, relatively economic. We've seen a decoupling of gas and oil prices over the last couple years. And gas prices right now are staying low.

There are environmental concerns with tracking and shale gas production more generally. I think EPA has spun up a study to look at those. I think we need some coherence in the state regulations about how you produce unconventional gas, but certainly for power, I think it's a game changer. And you look at EIA's projection of what power capacity will be installed over the

next 10 years, and gas is the biggest piece of it by far.

On transportation, for fleets, sure, why not? And the delivery vehicles and other things like that maybe even long-haul trucking if you want to do that. The problem for more broad acceptance is simply the distribution infrastructure. And do you want to go to gas, or do you want to go straight to electricity? And I think it takes a lot of study to really understand what the advantages and disadvantages are doing that.

One of the issues, of course, is if you go to gas significantly for transport, you wanted to do all of transport or let's say light-duty transport, you'd need something like a 50-percent increase in current gas production to power that. And we've got lots of other growing uses for the gas. So I think it's a systems issue that needs optimization.

MS. HOFFMAN: And one thing that we need to keep in mind that Michael Heyeck brought up

earlier in our conversation is we're getting into the just-in-time processing within the electric sector and storage, the different storage requirements. We're going to lose some storage requirements as you look at the storage of coal, your storage of gas. It's going to have to be looked at as well across the system. And Mike was talking about that earlier in our conversation.

DR. KOONIN: Storage of the fuel and stuff, yes.

MR. COWART: Can you comment on the degree to which -- I would -- I'm intrigued by the title of the quadrennial plan. That is the Quadrennial Technology Review. And maybe you can comment on that --

DR. KOONIN: Why is it that?

MR. COWART: -- on this strategic -- and the reason I'm asking is that, you know, a lot of the things that you're talking about, it's -- there's -- say, the consequences for the nation lie at the intersection of the technology and the

policy.

DR. KOONIN: Right.

MR. COWART: And so it isn't just, gee, what's on our list of available technologies, but rather, what does this imply for policy?

DR. KOONIN: Right. Let me start at a higher level and I'll get eventually to the answer to your question, which actually I think an interesting one.

Let's contrast energy with defense. Defense is a function that the government decided more than two centuries ago was really important for the government to carry out. And it has put into place a number of organizational constructs that make sure it gets done independent to what happens in the political system. We have a professionalized corps of people in the government, not only the uniform services, but also Acquisition Corps, and Logistics Corps, and so on, who make sure that that gets done.

We have enduring apolitical organizations like the Office of the Secretary of Defense, the

Joint Chiefs of Staff, which make sure, again, independent of politics that the mail gets answered so to speak.

And then, finally, we have a bipartisan four or five-year planning process, the Quadrennial Defense Review, which sets strategies, goals, budgets -- or at least budget recommendations -- for the defense function.

If we were really serious about energy, we would try to get some of those same sorts of things in place. Of course, energy is different because, as I mentioned, it's all in the private sector. Nevertheless, there's a fragmentation of responsibilities and, frankly, as many people realize, a lack of a long-term analytic planning in what we're trying to do in energy.

This PCAST report which was issued, the President's Council of Advisors on Science and Technology, was issued in November, called upon the government to execute a government-wide quadrennial energy review, analogous to the defense review that's been going on for several

decades now. But it recognized that that would be a major undertaking because you look at all the parts of government that touch on energy, some of them represented around this table. It's a really big undertaking.

Also, recognizing where in the presidential election cycle we were, they said, you know, DOE, you get started first. And try to undertake a DOE centric review that would try to lay the groundwork for a possible review going forward.

The Secretary has, in fact, taken up that recommendation, and we're kicking that off in the next few days, as I mentioned. It may lead to a broader energy review, but that remains to be seen.

Why does it have the word technology in it? Well, again, it is because there are so many agencies across the government that affect policy that we figured it would be hard enough to get all the technology folks singing from the same page. And so that seems to be a pretty useful

task in the next six months which is when we hope to deliver this thing.

I would like to get a coherent framework for thinking about energy, some sense of prioritization among our technology programs. That's a necessary foundation for any good policy discussion. So, that's why.

MR. HEYECK: I think you answered my question. I just wanted to piggyback on what Pat was saying regarding the security of the delivery system, whether you're talking gas, oil, transmission, rail, road. All is required to deliver our energy.

It's remarkable -- I think I've said to someone I think the jet fuel at major airports is measured in hours. It's amazing how fragile our infrastructure is, and it's going to become more and more fragile as we move forward.

But the other side of this is the security risks of EMP, solar storms, the propensity to want to stockpile large transformers because the manufacturing for large

transformers is outside the United States. I would really like the Department to actually seed incentives to get the plants back here. And we are going to be replacing infrastructure.

I mentioned to Pat that Mitsubishi's announced in Memphis. There's another manufacturer announcing. But to the extent that we get manufacturing back here, then we have the infrastructure in place to replace should these things occur.

DR. KOONIN: The issue of bringing manufacturing back to the U.S. at one level is above my pay grade, right, because it involves labor costs, and regulatory issues, and financial regimes, and so on. But one way we can help is if we do the innovation, which this country, I think, is second to none. Then the high-tech manufacturing, we can and should have here. And that's one way of bringing the manufacturing back to this country.

The broader issue, I think, is a topic that needs to be continually raised and pushed in

the broader public arena. You see the administration's doing that. It may have a hard time cutting through lots of noise, but we are talking about that.

MS. HOFFMAN: Which is really important and critical to making sure the next generation technologies get manufactured in the United States as much as possible as we can continue to do that.

One of the things that was also brought up in the earlier discussion is innovation, which is very hard in this sector of trying to drive innovation under a regulatory environment. And so that was another comment. Tom?

MR. SLOAN: Thank you. You know, when we talk about energy security, and you started out that way. You're talking immediately about the amount of oil we import, excluding our Canadian neighbors. But the last thing you touched on which was the innovation and Mike's job creations touch -- I mean, if we're going to be trying to convince the American public whether it's for

economic reasons, or for environmental reasons, or for whatever, that we need to go to electric vehicles or less polluting vehicles, I think we need to make a concurrent educational effort to say but you have to buy American innovation. And, yes, the price will be higher because we pay our workers more, and we require more in benefits and whatnot. But that concurrent education function I think if we want energy security has got to occur.

DR. KOONIN: For the general public I think what you're saying is exactly right. On the other hand, you know, I have met and discussed with very knowledgeable and learned people about this who will take the other side and say flat world, we optimize things by letting activities happen where they're most economic.

What I would argue -- and again, you-all well know this in your world -- there is hardly any such thing as a separation between the public and private sectors. And the best example I like to cite is simply nuclear power where the

government made a very deliberate decision 50 years ago to bring that technology into the private sector and has been effective in doing that -- not so much in the last few decades, but at least for a while.

There are many other examples where government actions have stimulated innovation and change in the private sector. And we shouldn't let ideology stand in the way of doing that again.

MS. HOFFMAN: Any other comments, questions? Barry -- I mean, David.

MR. MOHRE: One of the things that we kind of skirt around a little -- Tom, you sort of came to it -- was the issue of creativity in manufacturing. I think Senator McCain unfortunately put his foot in his mouth the other day when he said I agree with innovating. Look at this iPad and said it was manufactured in this country. Wrong, zzt, wrong.

So the question is, okay, we're innovative, and then we transfer that innovation

to some other place. That's a continuing pattern that we have had. Given what we're dealing with -- and let's call it energy security -- do we need some form of -- and gee, I hate to say this, but I'm going to say it anyway -- industrial policy for this nation that if you have a critical asset, you don't have to build them all, but don't you need the capability to build some of them?

DR. KOONIN: If this were the Groucho show, the duck would come down. You said the magic words, right?

(Laughter.)

MR. MOHRE: You're showing our age.

DR. KOONIN: Look, I think there really needs to be a very good healthy discussion of what a proper industrial policy will be, not only for the energy sector, but for iPads and all of those things.

Can you really -- and I'm agnostic about it. Could you run the country as a nation of iPad designers and just let the manufacturer

happen somewhere else? I don't know.

There are some things I think it's absolutely essential that we be able to manufacture here for security reasons. The industrial base that supports national security, some of the IT things we need to really manufacture here, but there are credited people who will make a case that let all that other stuff go and focus on the high end. Now can you really employ 50 or 60 million people doing that? I'm skeptical.

MR. MOHRE: Well, even if it's employment, you know, a few decades back I used to run something called the Defense Electric Power Administration, which was something that dealt with what happens when they start dropping the bombs and how would the electricity system work and other things.

And when I got into it a little bit, I found out, guess what? We can't manufacture a tank turret in this country. Hmm, how are we going to fight a war? But that's a little bit

off of this, but it's related to that industrial problem.

DR. KOONIN: It's related, yeah.

MS. HOFFMAN: All right. We'll quickly go through two more questions and try to keep it on time. Brian?

MR. WYNNE: Yeah, more of a comment, Mr. Secretary. I think -- I commend you for the quadrennial approach. I think that's extremely important.

I just wanted to make the connection as I'm representing electric drive technologies here that, you know, a buyer of first resort here is the federal government. We have an enormous fleet. And that fleet is going to suffer with the volatility of gasoline prices, et cetera, et cetera. And I think that needs to be looked at -- the entire energy use of the government that comes into play here.

On the electric drive side, obviously the technologies continue to move and advance through, you know, many efforts, including at the

forefront of the efforts in DOE and the vehicle technologies program, but we have this, you know, our own national labs are telling us that we could fuel north of 70 percent of the existing light-duty fleet with off-peak kilowatt hours in this country. I mean, there's an enormous amount of economies that get created here as we encourage the utilization of an electric motor which we've always known is better than a combustion engine and always will be.

So, Peter Whoriskey article in the Washington Post notwithstanding, my Volt downstairs is telling me I'm getting 250 plus miles per gallon over the course of the last 4,000 miles. I've been to a gas pump once with a Chevy Volt, and I've used 14.8 gallons of gasoline. That feels really good, given what's happening right now in the marketplace.

The question is how fast can we accelerate this? It's like prepaying a mortgage, a front-end loaded mortgage. The more we can bring that deployment schedule in, the faster we

can get down this cross curve and adopt the technologies. My point again is the federal government can lead here. We have an enormous opportunity and all the motivation in the world.

DR. KOONIN: So yeah, I generally agree with that. Just a couple of comments. One is that, you know, in terms of at least greenhouse gas emissions the electric vehicles are better only if you make the power in the right way. And there are certain regions of the country where the coal heavy nature of generation actually makes it worse than gasoline vehicles. So you-all have got to get to a lower carbon supply if you want the internal combustion engine to fade away faster.

The second is there's a lot of discussion about federal purchasing power, but I frankly need to be better convinced of that. The federal government purchases 50,000 vehicles a year. That is half of one percent of the light-duty vehicles that the country purchases every year -- purchases every year, not the fleet. And so, the

purchasing power can help a little, but again, Chevy is talking about 100,000 Volts a year. If the government bought all of them, that would be great. It would cost more money than the alternatives, but not a material effect in stimulating demand.

Just another, you know, facts and figures, the Department of Defense uses 300,000 barrels of oil a day, 90 percent of that for tactical use. There are great advantages that can be made in tactical efficiency. And we should do that. But in terms of DOD driving demand, no -- small potatoes.

MR. KELLIHER. Mr. Secretary, I live in Massachusetts, and in New England there is an incipient movement headed by the NESCOE, the New England State's Committee on Electricity, that is contemplating a regional procurement of renewable as part of, frankly, kind of a regional industrial policy that might include onshore wind, offshore wind, and other renewable type assets that could be bid into sort of a

competitive procurement.

And one of the questions we struggle with in the group that's trying to think this through is what would the economic benefit beyond energy be to the region. Is the Department able to help with that? Are there studies that the Department has done that we could --

DR. KOONIN: I turn to Pat for that.

MS. HOFFMAN: I don't know if we have any specific studies in that area, we'll have to talk about that further.

DR. KOONIN: My own urging, by the way, even though I'm a technologist, I think by the time you get to real world deployments, you really want to be as technology neutral as you can, consistent with what you're trying to do.

And so I think you have to decide are you trying to promote renewable. Are you trying to get emissions down? Are you trying to get off of fossil fuels? And they're all different, you know, high level goals that will lead to different answers.

MR. KELLIHER: If you ask the Governor, he'll say, "I want jobs."

DR. KOONIN: Ah, right. Well, right. That may give you yet a different answer.

MS. HOFFMAN: I agree with that last point. Okay. With that we're going to close out. I thank you very much for coming today.

DR. KOONIN: Thanks for your attention.

MS. HOFFMAN: I appreciate it.

(Applause.)

MR. COWART: We're ready to -- so, perhaps we could -- while we make sure that lunch is going to be available when we break, why don't we continue the conversation we were having just before the last presentation? And I recall there were still some people who had cards up, so, Gordon had his card up, and Rick did. Okay.

So why don't we -- but it would be nice if we were calm for five minutes and finished this one off. Gordon.

Oh, maybe I should hear from Rick and then let you --

MR. van WELIE: Okay.

MR. BOWEN: Sorry. I wanted to build on what he said, which I think is not just in his region, although I know he was speaking for that.

I would actually assess that even the Midwest region is probably even more impacted by -- associated with what is written here in these words from a planning perspective and a coordination perspective mainly because there's so much solid fuel assets that are tied to that, I know recognizing that he has a lot more on the oil side and there's just some things that are occurring in that area to him.

But I think the concern -- and the reason why I fully support what you guys have down here is because it's -- it's growing exponentially. Okay. So every year we delay in making change or firming up where we're going to stand relative to emissions and things of that, it's going -- it's just going to accelerate significantly because I know as a generator owning generating assets and have all my career that people are delaying

making financial decisions about those assets of which -- I don't know what the percentage is of -- are in IPPs today, but it's very significant that are being held by those people.

And you're not, despite how hard NERC and others work to try to make some definition around that, you're not going to get the data as she was speaking to already. So it's -- the frustrating piece to it is at least as long as you can get the agencies, you know, having that dialog and really trying to make that assessment on impact, I mean, that's just got -- that work has got to be done.

It cannot be done in silos. It cannot be done by a single agency without the support of the other agencies to get there because it's -- again, every year that we stand here and we wait in limbo and not with that coordination, if indeed there is a position taken by an agency like EPA or otherwise, the ramifications of that, I mean, it's going to very quickly be known because those -- and it's not that hard to get to

the detail that she was talking about because everybody knows what compliance means.

And if you take it to certain levels of compliance, clearly we know which power plants will not comply. And depending upon when you put those dates on it for compliance, I can guaranty you those that are less than 100 megawatts on solid fuel are gone. I mean, it's just -- it's not that hard.

I mean, and then you kind of build up from there as to whether they can meet compliance and what the cost associated with that are. So, I'm -- I fully support, you know what's in this and clearly believe that that interface and relationship has to occur within the agencies for sure.

MR. van WELIE: I just wanted to respond to Sonny, and then Lauren's comments.

To Sonny's concern about whether this is a resource adequacy issue, I don't see it as a resource adequacy problem per se because I think there are mechanisms in place like the capacity

market constructs that over time ensure adequate resources. So I see it as more of a transmission security problem.

So when you lose a specific unit at a specific point on the system you now have a problem where you either have to retain that unit, which many people don't like, or replace it with something else or build a wire to have it displaced with a resource from some other part in the system.

I think all of the system operators, planning authorities, have mechanisms today for maintaining reliability, but you can argue that they're not efficient.

So let me expand that for a moment. If you get late notice on a resource retiring and there is no response from the marketplace, then the thing that you've got left in your toolbox is a transmission line basically. And in many cases that is the most appropriate fix, but it may not always be the most appropriate fix if -- and then you get to the question of could the signal fall

an alternative resource have been sent earlier in some way.

And so I think that's really the focus of this. It's a transmission reliability issue to begin with, and then there's a discussion about efficiency, but I don't really see it as an adequacy issues. So I don't think it falls foul of the debate as to who has jurisdiction over adequacy.

And then to Lauren's issue, I think you're correct. In the end you need to know unit by unit what's going to happen. I think there's a different construct you put around that depending on whether you're operating in the organized wholesale markets versus the sort of vertically integrated fully regulated by the state markets because by definition if you've identified a specific place on the system that happens to be a particular connection point on the grid, you've got 100 percent market power at that point. So whether it's a smart thing to sort of tell the whole world that or not, is

another discussion.

MR. MASIELLO: I have what may turn out to be very naïve and stupid questions, but, Gordon, between the incentives for renewable and the RPS goals and the way the capacity markets are run on the one hand and the impact of EPA regulations or aging plants on the others, is there a disconnect? In other words, is there any way that the incentives could change such that retrofitting old plants or cleaning them up got the same consideration as -- forgive me, Rob -- building wind farms in terms of net effect?

And then the second question would be is it within the purview of this group to think about that at all, or is it something not on our list?

MR. van WELIE: Not sure I quite understood that. I mean, the -- you said the incentives for renewable?

MR. MASIELLO: Well, if there's a plant in your region that is going to become not viable --

MR. van WELIE: Right.

MR. MASIELLO: -- right, because of loss of grandfathered SO_2, let's say, right? That's -- so they're penalized to stay in business, but we're giving incentives to other people to bring clean energy, but the money spent on that plant could have similar impacts in terms of net cleanliness. SO_2 may not be a great example, but coal to gas would be a good example.

So I'm simply saying are the incentives --

MR. van WELIE: You're questioning an underlying policy. I mean, so I think the question -- somebody raised that, which is what is your policy about. Is it about getting more renewable on? Is it about reducing CO_2? Is it about creating jobs? I think most of the states sort of get confused about that.

(Laughter.)

MR. MASIELLO: That was why I asked, but then if that's the case, then the next question is: Is this something this group's able to think

about, or is it outside our charter?

MR. van WELIE: I think it's outside --

MR. COWART: I'll give you a quick reaction to that, that I think it's probably outside the charter of this group. We can discuss whatever we want to discuss, but in terms of particularly this proposed action, I would say -- I would recommend that it be a topic for another day as to whether, you know, we could design capacity markets, for example, to not be technology neutral.

I mean, it's possible to design a capacity market that pays more for clean energy than it pays for fossil energy. It pays more for gas than it pays for coal. It's possible to do that. That's the conversation I wouldn't expect to have around this table.

I do have a recommendation for the Committee because I'd like to bring us to action on this item. I've heard three small recommendations for wording changes to this memo, but I'd like the Committee as a whole to approve

the memo, or I'm going to recommend that you-all approve the memo so that we can take an official committee action.

And the changes which I would make to it are to change the word fossil in fossil generation in the second paragraph to thermal because I thought that was a correct observation on that score.

And picking up on Sonny's point about state regulatory authorities in the third paragraph I would perhaps -- I think we could add after EPA and state regulatory authorities to ensure. And then throughout -- there's a couple of instances in which we use the term planning authorities because that's -- we're all used to the old terminology instead planning coordinators, but we just change authorities to coordinators and that --

MR. CURRY: Can we have a vote on that, please?

MR. COWART: Anyway, with those changes how does the Committee feel about approving this

as a communication to the Secretary or --

MS. AZAR: Richard, could wait until after lunch because I've actually been listening to the discussion rather than reading this, so --

MR. COWART: Of course.

MS. AZAR: That would be great.

MR. COWART: Yeah.

MS. AZAR: Okay.

MR. COWART: Yeah. And if -- if others have recommended changes, we can take them up at that time. All righty? Dian?

MS. GRUENEICH: Are you defining planning, I guess, coordinators is your new term in --

MR. COWART: It's not my definition.

MR. NEVIUS: It's a definition in the NERC functional model and the NERC --

MS. GRUENEICH: Right. But I'm just thinking --

MR. NEVIUS: -- standards.

MS. GRUENEICH: -- it probably makes sense to put --

MR. NEVIUS: Well, you might want to put a footnote exactly what that definition is so you can pull it out of --

MS. GRUENEICH: My only -- my hesitancy is is that in one place it says this is recommendation to DOE and DOE to then advance the recommendation to FERC. And then in another place it says it's a recommendation to both DOE and FERC. So I'm not quite certain whether we're now undertaking advising FERC as well as advising DOE.

And this is more internal within DOE how will DOE be communicating this recommendation to FERC? Is there an open docket? Does DOE typically intervene or not intervene? And these -- you know, I'm a lawyer. These are sort of lawyer-like questions but it is something to say here's an Advisory Committee recommendation that is really going to DOE to FERC. And I just -- sort of really what's going to be the process for moving this forward?

MS. HOFFMAN: Could be as simple as a

discussion. It could be as complicated as a letter from the Secretary to the Chairman.

MR. COWART: Okay. Well what I heard was let's look at this over lunch and any further recommendations for changes can be discussed at that time.

(Comments made by Ms. Welsh off microphone were inaudible and not transcribed.)

(Mr. Vague and Whythe left the meeting.)

(Brief recess.)

AFTERNOON SESSION

MR. COWART: All right. Thanks, folks.

I realize that people's schedules are pressing, so we should just get -- turn the crank and get on with our conversation.

Are there other comments about our editorial suggestions with respect to the memo that we were discussing just before lunch? I see Joe's got one and Lauren has one. Joe.

MR. KELLIHER: With respect to the second recommendation, if I were still at FERC, I'd be confused by the recommendation because I'm not -- it's not -- to me it's not clear what we're -- what we're recommending. Are we arguing that FERC's the problem and I'm not -- of course, I don't defend FERC anymore, but I might explain it sometimes. Is it that FERC's the problem and FERC has kind of impaired regional planning and made it impossible for regions to plan around retirements in a way that we think is better?

Or is it that regions on their own have adopted the -- an incorrect view towards planning around retirements and that FERC has let them do that? So and it's different in that what do we

want FERC to do if -- if they think we're recommending the first, FERC's going to be puzzled and think, "Well, we're not the problem," and they will probably do absolutely nothing.

If they think what we're saying is, "Planners aren't doing this right and, FERC, you need to save the day. You need to fix that," then that's a -- you're asking them to act, but to me it's not clear that we're asking FERC to take a specific action. We're saying, "Hey, there's a problem with retirements and it's not -- generation retirement planning's not working very well."

And FERC might shrug and say, "Yeah, we sort of agree."

So I think if we're asking FERC to act, we have to be a little bit more specific. And then legally are we asking FERC to initiate a national 206 to change regional planning and all tariffs governing regional planning? And if so, that's a, you know, a very specific ask, but usually you actually have the burden to make a

case. And I don't know if DOE wants to assume that burden.

MR. van WELIE: So I'll say something and then I'll pass it on to Pat. Maybe she's got some thoughts on this.

But the -- so I don't think FERC's the problem. I think it's the -- if you're really asking the planning coordinators to expand what they do in terms of planning. And they could do so naturally of their own and that will occur on a time frame that would be consistent with how important each region felt that that issue was to them.

But what I hear DOE saying is that they're concerned about this issue from a national perspective. And so, in the early discussions there was some discussion about should there be some institutionalized process for looking at this problem.

And my response to that was it makes no sense to set up a separate and parallel institutionalized process for looking at this

problem. There's already an institutionalized process. Each planning coordinator has to go off and do these plans, and those plans are a requirement of NERC and ultimately the oversight authority is the FERC.

So if what the DOE wants is some institutionalized response to this problem that they perceive, then the most efficient way, I think to get the answer they're looking for is through a process that already exists. And then you have to ask somebody to go and change it.

So the DOE could go to each planning coordinator and say, "Please change your process." That's one way of doing it. They could bypass the FERC entirely on this one or they could go to the entity that essentially controls and regulates those entities. I think those are the choices.

MS. HOFFMAN: I would just add to it that what we were trying to figure out is what are some of the different solution sets to keep us ahead of the game? And looking at this problem

of potential retirements of plants and so part of it is just the discussion of opening the dialog of saying what are the options out there, and what can people do.

MR. COWART: All right. Lauren first and then Mike.

MS. AZAR: Yeah, just a recommended comment for an edition on page 2, the last paragraph -- this would be -- it appears to be the first long sentence. At the very end we talk about the retirement of resources as a consequence of EPA regs, but as we heard from Gordon, there are other reasons that we expect retirements in different parts of the nation, so I would somehow broaden that to aging -- possibly aging infrastructure -- retirements due to aging infrastructure.

And then I think there is a typo at the very beginning of that sentence. It says, "Power systems are can."

MR. COWART: Yeah, are can. Right. Okay. Do you have -- well I'll hear from Mike

and then I'll ask Joe if he's got a wording change he wants to suggest. Okay. You got a wording change? We can -- there's no implication in this, as I read it, that FERC is the problem. It's simply that we recommend that DOE communicate this to FERC.

MR. KELLIHER: Sure, might. I wasn't -- my main point was we want it to be clear to FERC what we're asking them to do, and I don't -- this is saying -- this seems to say, "FERC, we're informing you that generation retirement planning isn't really properly calculated." And FERC might say, "You're right." And they feel -- they agree. They -- there's no action they have to take.

And if we want them to take action, I don't know what it is. Is it we're asking them to initiate a proceeding and do -- we're either asking them to act or we're not asking them to act. If we're just informing them about a problem, then I think the current language is good. If we're asking them act, I actually am

not sure what action we'd be asking them to undertake. Is it for them to direct NERC to plan differently and the planning coordinators? Is that the term of art?

Anyway, group writing is something I -- I fear probably more than most things. So I'm not sure how to do it in this room to be specific on what the ask is, but I think we need to decide. Are we asking FERC to do something? Yes or no. And if the answer is yes, what exactly do we want them to do?

MR. COWARD: Tom?

MR. SLOAN: Thank you. I think what we're asking the FERC to do is to be an enabler for those regional coordinators to adjust their modeling or thinking in terms of trying to get earlier timelines on when plants may be retired. So we're asking the FERC to enable that process to move forward, they having the -- the larger hammer.

MR. KELLIHER: But then do you want to -- I'm sorry. Can I just respond? I'll be very

quick.

But then to what extent do you want FERC to instruct them on how to do it? Because I think some people would not think that NERC's analysis was very correct on what the generation retirement impact might be of all of the combined EPA initiatives. So if you do -- if you don't like the way NERC did it, do you want FERC to instruct them on how to do it different?

And then could we -- do we -- would we actually agree that it wasn't done perfectly and how to change it, how to do it differently?

MR. COWART: Gordon, do you have an answer for that?

MR. van WELIE: I don't have an answer, but here's a -- just a thought, Joe, which is I see the problem that you're raising which is the precision of the request. I guess one thing that comes to mind is we may not want to be prescriptive. I mean, all we may want to do here is simulate a conversation and have the right levels at the DOE and the FERC have the

conversation and then decide between them what the most effective mechanism is for dealing with this.

MR. COWART: I can certainly say what I thought when the Committee discussed this and at some point these words came off of my computer, but I can't claim that they were originally penned by me because it was a group effort.

But I actually think -- I personally think that being prescriptive, being lawyerly in the fashion that you're recommending is not what we want to do. I think the Department wants to hear from us a general recommendation, and they can decide in what manner they want to advance that recommendation to FERC and exactly what they want to say to FERC. That's how I would view our advice is we're giving the Secretary and Pat Hoffman a general recommendation. They can take it forward and I assume we'll hear back at our next meeting what happened.

That's how -- to be clear, as -- in terms of writing this, I was not trying to be

prescriptive about an exact procedure.

I've taken on board the recommendations for wording changes, and will include the last one.

Now assume for the moment that those things are included. What's the -- I'll ask David two things. What's the process for this committee advancing a recommendation to the Secretary, and what's the action step we take right now in order to decide either to do that or not to do that?

MR. MEYER: I think the format that you've adopted here is just fine. That is, a memo to the Secretary and to Pat Hoffman. And we will -- once we have it, we'll make sure it gets the attention that it requires from the Secretary and his staff.

So, it's a -- as soon as the Committee is comfortable with the text and has it in electronic form, they can send it to us, and the -- in some way or other we'll let the record show that the Committee and acting as a whole chose to

do this.

MR. COWART: I suppose the -- just to be formal about it then, if someone wants to make a motion to adopt this and forward it to the Secretary and to Pat Hoffman, then that seems to be the action item. Tom?

MR. SLOAN: Mr. Chairman, I would move that the recommendation be approved by the Committee subject to the editing that we have discussed and be forwarded to the Secretary and to Ms. Hoffman.

MR. COWART: All right. Thank you.

MR. BOWEN: And I'd second that.

MR. COWART: Thank you. And any further discussion? All right then. All those in favor say, "Aye," or wave. Thank you.

Any opposed? All right. Thank you.

The record can show that this was unanimously adopted. Thank you very much.

At least for this iteration of the Committee, I think that's the first formally adopted action.

All right. Our conversation for the rest of the afternoon deals with recommended -- or some requests from the Department about tops involved in transmission. And I guess this is a good time to announce that we are very fortunate that Lauren Azar has agreed to accept appointment as Chair of a new subcommittee, the Transmission Subcommittee. And I'm thrilled by that fact. And so we are going to be creating a new subcommittee on transmission.

And we're -- just to let you know that in the traditions of this committee, subcommittee membership is voluntary and open to all. Perhaps everybody doesn't want to be on the Smart Grid Subcommittee, and the Storage Subcommittee, and the Transmission Subcommittee, but those are choices that you can make as an individual.

And do you want to say anything more about how you intend to go forward with the Subcomittee, Lauren?

MS. AZAR: Yeah, I can hopefully briefly talk about it. First of all, it's going to be a

lot of fun, and it will not be controversial, so --

(Laughter.)

MR. CURRY: Then why bother?

MR. AZAR: You know, I think we're going to have a discussion -- I'm assuming right now -- about some of the issues that Assistant Secretary Hoffman would like us to address. As Rich and I were talking about this, I think in all honesty most of us know what the sort of panoply of possible answers are to these questions. The problem is who actually gets to make the decision and how do we get there.

And so, I would foresee this, hopefully, as being a rather surgical strike subcommittee where we flesh this out. Possibly I'll prepare a document in advance with at least what I see as some of the potential answers. And then either we will have, you know, one face-to-face meeting -- I don't know if that's going to be financially possible or a conference call where we pound it out and come up with a product. So I don't see

this as being something that's going to take a long time since I think most of us know what the range of options are, and it's a matter of trying to figure out if we can come up with some recommendations.

MR. COWART: All right. Thank you. Maybe now this is time to turn to the questions. Are you up, David or --

(Comment by Mr. Delgado off microphone was inaudible and not transcribed.)

MS. AZAR: We already signed you up, José.

(More comments off microphone were inaudible and not transcribed.)

(Laughter.)

MS. AZAR: How would you like to do this, Rich?

MR. COWART: I think we'll just circulate a piece of paper and let people sign.

MR. HEYECK: Mr. Chairman, I just have a --

MR. COWART: Yes.

MR. HEYECK: As the unfortunate head of the last Transmission Committee --

(Laughter.)

(Comment off microphone were inaudible and not transcribed.)

MR. HEYECK: Take a look at the section in the report. That was really the compromise, the planning, cost allocation, and siting. If those are the three subjects that are going to resurrect themselves, there's going to be munitions and other things, but I like concept of revisiting some things, but there's also other topics that we didn't cover such as resiliency and the greater subject of grid planning.

I think planning, we gave it kind of a soft pedal. It was really cost allocation and siting.

So I would volunteer to help you out, and I could help control Dian.

MS. HOFFMAN: Mike, I thought -- I thought you were volunteering to do a new subcommittee on resiliency.

MS. WELSH: So, Pat, I've just given a piece of paper -- just sign it if you're interested. Then we'll use that as the basis of all future communications for this new subcommittee.

MR. COWART: All right. David Meyer has volunteered to take us through this list of questions and to facilitate with Pat Hoffman a discussion of sort of getting us going on reacting to them.

MR. MEYER: Well this -- first, I want to say we don't intend that you feel that you have to do all five, or you don't have to take on the questions exactly as written. In the time-honored fashion of many graduate students, you will interpret the question as you wish and then answer. So I don't -- you've all had a copy of this and I hope have had a chance to read it, so I'm not going to go through it in great detail.

The funding question, number one that we start off with is one that I think about a lot. That is, we are supporting these long-term

infrastructure planning capabilities. We feel it is important that they be established in such a way that they can do iterative analyses for the indefinite future. That is, this need is not going to go away.

This is an industry that is undergoing a transformation and will continue to do so over decades to some. And it is so laden with public policy issues that it -- to me, it cries out for a planning process that involves both the industry people and state officials and also NGOs for that matter.

So, there is a need for this capacity. It's a question of how to fund it. The Recovery Act money will run out soon enough, and so it's timely now to start thinking about how to go forward here. So I welcome your opinions on this and want to hear more about them.

The second one --

MR. COWART: Do you want to take them one at a time?

MR. MEYER: Yeah, sure. That's fine.

Let's -- that's probably the best way to do it. Yeah?

MR. COWART: Yes.

MR. KRAPELS: David, do you envision this as a continuation of the current sort of EIPC procedure or what's the venue? How does it relate to RTO and ISO planning?

UNIDENTIFIED FEMALE: Can you use your mike?

MR. KRAPELS: I did. I'm sorry.

MR. MEYER: Well, we don't -- we're -- certainly, I don't think any of us on my -- in my office think that we necessarily hit the bull's eye the first time with what the projects that we launched under Recover Act money.

And so we're not wedded to that particular way of structuring these kinds of analyses. And it -- I think it is important to do it at a broad geographic scale and to do long term, that is, 20 years at a minimum. And the Secretary wants us to go out a little further if we can.

Because the long-term analyses clearly gives them sign posts for the shorter term analyses that the industry typically does. And it's important if you're thinking 20 or 25 years out, you may modify your shorter term plans accordingly. Yeah, and I think that that synergy between those different time frames is an important one to bear in mind and support. So -- Dian? Sorry.

MR. HEYECK: And I'm probably going to agree with Dian. The current timeline for the planning efforts seeded by the 80 million is 2013. And so my question would be of why not wait until we get there.

However, there are other issues that I think need to be surfaced. One being what we talked about today that we are going to move to more and more Just In Time. So the security of the grid, not necessarily the traditional reliability approach is going to be important, and that treads on cyber security as well.

And then the other is the -- if there's

any research on the analytics, we tend to do more deterministic planning rather than a stochastic way or probabilistic way, which could incorporate some of these generator retirements and things like that. I mean, if it's research into that end, that -- what I'm suggesting is let's wait for the current processes to offer some traditional planning, but there are things we can do in parallel.

One thing to note in history is we began planning for the interstate highway system in the '30's and actually had another plan done in the '40's. It took 1956 for it to be enacted. And the issue with any of these plans is who's going to pay for it. And the issue with the current studies is cross-border issues. I think regions do a very good job. We could always criticize, but I think they do a pretty good job. The issue's going to be between regions. And I'm not sure how that's going to come out of the study. I'm sure we'll have transmission lines traversing Regions, but the argument's going to be who pays

for what when it crosses the border?

I know that's a lot, but the crumb is we've got something going through 2013. If it's analytics or security, maybe that's an increment or an augmentation.

MR. DELGADO: Okay. I am going to add a little bit to what Mike said, which I agree with. And it's -- I think there's a necessity to facilitate the partitioning of State Commissions in a longer range planning. This is something that became very apparent to me years ago when we were trying to build across certain borders. It is very -- not every Commission has the resources to do this. And I thought that one of the things that DOE could do is not only to contribute some resources but also contribute some ideas.

The interdependence between states is not very clear with some Commissions. And let me put it very blame -- and I don't want to pinpoint, but it's not very clear. Sometimes you get a Commission no mention that feel that today we're fat, dumb, and happy, and this is the way it's

going to be for a long time, but if you were to -- my feeling was if we were to look at a 20-year plan and they realized that what today is quite adequate, 20 years from now it is not. And, frankly, the best solution is to link up with somebody else.

The fuel is usually coming from someplace else. I thought that having DOE direct -- not direct, participate particularly funding will, in fact, provoke a broader thinking, a longer-term thinking that would encourage its cross border.

Mike talked about between planning authorities like the ISOs. Well, I think it's between states, too, and state jurisdictions. Remember that the states do have a lot of authority everywhere these things are put. And it would encourage them to realize their tremendous interdependence and tremendous benefit of interdependence.

Now recently there was a very -- I was going to say a successful effort between five states that included Wisconsin and going west.

And it took quite a bit of work but ultimately came up with some conclusions of common needs.

And you might say, "Well, this is not big enough. They have to go east and west from there." But, you know, I would say I'm satisfied because it began where we are and surrounds us. So you've got to begin someplace.

And that required quite a bit of resources from those commissions. Now not ever Commission can do that. So I'm -- I'm going to support you in order to create a longer view -- help the Commissions to have a longer view of need and greater interconnection between them.

MR. MEYER: Let me respond to that briefly, that yeah, we -- we've noticed in the west where some of this kind of analysis is -- has somewhat longer history that by looking at some of these questions on a west-wide basis that subgroups of states begin to say to themselves, hey, we need to really focus in a little more on this particular problem. They under -- in other words, they learn from that one process and it

feeds into a more productive approach to certain kinds of regional problems.

And I'm not saying that the states wouldn't maybe get there independently in any event, but this does seem to help. It -- and so, I -- that's a benefit that I think we're seeing. It's -- but we'll continue to watch for that sort of interaction.

MS. GRUENEICH: I'm going to talk just about the western interconnection because I'm not that familiar with the east and don't want to speak to it.

The way that it's written here, it's actually a very narrow issue, which is basically how would you pay for travel costs for state regulators and NGOs so they can participate. And I wonder if that's really the issue you are trying to address because that seems to me within the scheme of things to be an awfully harrow issue for this group to address travel costs.

Then you step back and say, well, maybe the bigger issue is when the Stimulus money runs

out, how will the consultants who have been hired be funded where -- you know, there's $80 million that's going -- I'm not -- I can't even remember the budget, but I'm assuming it's gone to hiring internally staff, for example, at WECC and at WGA some of who have come on line, I believe, as staff, a whole bunch of consultant money, acquiring some models to do interconnection-wide planning and then that portion called travel.

So if we are going to look at this, it seems to me we -- you know, you need to start breaking it down into what were the categories of expenses, but I -- I come back a little bit to with what Mike said which is the products are twofold. One is September this year is the first plan. And then in September 2013 is the second plan.

And it seems to me until we see the first plan, we don't have much sense to be able to make any sort of a good judgment about the benefits of continuing the process and how it would be changed. I, for one, actually hope this doesn't

turn into a whole process to produce a plan every two years because that's going to take a phenomenal amount of energy. And I think instead, it needs to be okay -- by 2013 you're going to have two plans on the table with various scenarios in each of those plans. And the question is who's picking up -- who's making the decisions as a result of those plans, and how are they going?

And it just seems way too early to know this whole process that you've put in place. Is it the right process? How should it be modified?

And then I'll just end with saying, I mean, my particular view -- have been again, for the west, is that this is something that needs to be embedded within the west, quite frankly, funded by folks within the west because that's where they're going to have some real ownership. And that's really going to be the tricky part. I mean, having the DOE money has been fabulous, but at some point it is -- you have to play -- the grown-ups have to get to the table and say, "This

is important enough to have funded on our own."

So I'll just stop by saying it seems to me that, you know, we may need to see at least the first iteration of the plan to be able to really have a good discussion about how should this continue, what are the funding issues that need to be addressed?

MR. MEYER: Let me say that we -- we've gone back and forth, certainly on my side and the people on the -- you know, that are actually doing this stuff -- about where is the value added. Is it from the plan, you know, the paper product, or is it in the process?

And I'm -- I, personally, feel that the value added is largely in the process, that the plans under current law are going to be advisory. They will be informative to people, whether corporate, or regulators, or policy makers who have decisions to make, but nonetheless, they are essentially informative documents.

But in terms of process, what you get out of it is -- to start with a common database, a

common vocabulary, a common realistic understanding of what the options are that -- and not that people are going to agree on the merits of the options, but I think they will have a better understanding of what the pros and cons are associated with different options.

So I think what we're laying here is the basis for a much more useful and focused conversation on an ongoing basis, and we think that that can't help but be beneficial. And so far as how the process should be structured that I think certainly it's too early to make any firm decisions on that, but the real question is -- I mean, we're -- we're very -- one question that I raise with people frequently is what does success look like here.

How would we recognize it? Because I think we do need to answer that question particularly if we're going to argue for some ongoing kind of long-term process here. So, Lauren, I think you're up next.

MS. AZAR: I think the -- well, one of

the question we may want to answer is if we think this process is beneficial. I can tell you the plans -- plans with quotations around them -- that we're going to get out of the east in this iteration will help us in future plans to the extent we decide to go forward.

As far as being meaningful, to be frank, I'm not sure they're going to give us a lot of information vis-à-vis what the world may look like in the future just because of all the inconsistencies we've already been seeing and the glitches and things like that. So this has been a huge learning process in the east, a wonderful process, but if you're looking for actual results in the plans, I'm not sure that's what you're going to get in this iteration.

Speaking to David's comment with regards to process that does not mean this is unsuccessful. I think this has already been tremendously successful. Speaking from the states' perspective, having the 39 states and the Canadian provinces in a room talking, and, guys,

reaching consensus -- reaching consensus -- reaching consensus on what should be modeled in the Eastern Interconnection.

Honestly, a year ago did you think that was ever going to happen? I didn't, and I was leading it. So, you know, I think on a going forward basis, you know, in my mind, you know, how we fund it, I think, is a question we answer after we decide whether or not it's beneficial and whether or not this has been a success.

I know DOE just came out with -- I think it was DOE came out with a report indicating that the Eastern Interconnection actually is somewhat unstable. And so the question then is, you know, are -- should we be doing this kind of planning on an Eastern Interconnection-wide basis. I don't know the answer to that. I'm not a scientist, but I think part of the question is what value are we going to get from this in a going-forward basis, and if so, then how do we pay for it.

So I think the answers are going to be

different, in other words, for the west, the east, and ERCOT, because each of us are looking at very different things.

MS. HOFFMAN: I think you're -- I think you're referring to the FERC Frequency Study?

MS. AZAR: Yes, I am.

(Comments by Ms. Azar off microphone were inaudible and not transcribed.)

MS. HOFFMAN: I just noted the word unstable.

MR. van WELIE: So, it was interesting hearing Lauren define success. I would have defined it approximately the same way, which is I think the success of this effort has been in the educational process.

But I was curious about how DOE viewed this because you were the ones that put up the money, so what was your view of success?

MR. MEYER: I think I've already tipped my hand on that. That is the -- one of the basic premises of the whole initiative was that this industry is in transformation. This is a very

daunting transformation to manage. That is, make massive changes to the generation infrastructure, add a lot of transmission, integrate a lot of variable generation into the system, and oh, by the way, while you're doing all -- and keep the -- keep costs reasonable. And by the way, while you're doing all that, keep the lights on.

The only way we can do that is if we set up some kind of collaborative process so that the -- all the -- the states, the feds, the industry, the NGSs, and the public, we're all in this together. There's a tremendous capacity for different factions to stalemate each other unless we find ways to collaborate. And so, the idea was we need a mechanism where we can periodically look ahead, look at our options, and talk with each other about what does this mean, where do we need to go.

MS. HOFFMAN: From my perspective it's a process to be able to create a open transparent dialog around issues. We talk about climate change. We talk about future directions. We

need to get the right stakeholders together to say if we are truly going after a policy objective, whether it's a carbon objective or something else, what do we need to prepare the system to handle this and create a forum where it's not a gotcha afterwards, that, oh, we should've been able to talk about this and have this on the table ahead of time.

One of the values of the Texas CREZ Study was, look, you've got Option A, B, and C. Here's the cost requirement. You can decide based on your policy objective, but here is the cost requirements, here are the system requirements. Here are some of the things that we all need to be aware of.

MR. van WELIE: So with that understanding, I could see where you're going with this which is you wouldn't want it to end. If you see value that you believe that -- and I think there has been value created in terms of a better industry-wide understanding of some of the issues amongst disparate groups. And that's

already been achieved even before the first report.

And I think it would be healthy for the -- for that to continue in some formal fashion. I think you're correct that the entities like, you know, the planning coordinators and the industry can fund their own way on this, and they'll recover it in whatever way they can. The challenge is going to be how do you keep the state officials at the table. So I can see the problem that you're trying to solve, and I think it's a problem that's worth solving.

MR. SLOAN: Thank you. There -- I mean obviously we're continuing to reinterpret your first question which was what you asked for. And I come back to I think DOE can serve a significant role nationally by helping to educate and stimulate discussions between the stakeholders and certainly the Eastern Interconnect discussion. It's a -- that's a relatively technical level discussion.

Keep in mind that state legislatures with

the governor's acquiescence define what the PUCs roles, tools, and capabilities are. And DOE is funding a workshop next month that will have PUC Commissioners and the -- some selected state legislators -- like, Lauren's going to be speaking at that meeting. And it's one of the few occasions of which I'm aware where you're bringing the two parts of the state policy making community together to talk about a particular subject. In this case it's transmission technologies and how they may be able to alleviate political problems. You know, where to you put overhead lines? Where do you bury them? Where do you do other things? So, as I said, the DOE is facilitating that through funding assistance.

The -- a second thing that some of the folks at this table were at, including Gordon, is the Council of State Governments has a working group if you will looking at the feasibility and what might be components of an interstate compact for siting. How do you get states to adopt, I'll

say, a common form, format, timeline process so that -- with some kind of ultimate decision, you know, coming forward so you have those interstate lines that are not bogged down as AEP was for -- was that three decades, or three generations, or some long time.

But the -- the -- part of it, too, that the DOE, I think, can do is by stimulating these discussions is identify best practices. For example, one of the things that we have in my state is a law that allows our Commissioners to sit in concert with other states' Commissioners for hearings and decision making processes. That's heretical. Now, but it's getting at trying to have our policy makers, be they the Commissioners who have ultimate responsibility, or the legislators and the governors who will set that framework to see beyond the state border parameter.

You know, that -- one of the things that we constantly struggle with we talk about here but more in my venues is if you want an

interstate transmission line, and I don't see a benefit, why should I be paying for it.

Well, trying to get that education process going that there is a national or a regional benefit -- it's similar to -- again I'll use the SBP as an example -- we're trying to build transmission lines and have the costs spread across the beneficiaries. If a utility doesn't see a benefit for a line in Kansas, they have a potential to block it. You know, so what the SBP does is they build enough, you know, lines into their plans so everybody gets something and, you know, you go forward. That's not necessarily the best planning.

But again it comes back to I think the DOE has a significant opportunity to bring those disparate policy making groups together separate from and including the utilities or the expertise in terms of how do you actually keep the grid working but to define what the parameters of that new decision making model should be.

MR. BUTLER: Tom, as usual, you know,

you've seen this from the mountaintop almost because I couldn't agree with you more.

A couple years ago when I was President of NARUC my theme was breaking down silos. The whole idea was for legislators, for Commissioners, for governors' office, for rate-payer advocates, for the regulated utilities for the costs is talk about these things. And until they do -- and they're still -- you noted some developments along those lines -- it's still not anywhere near enough.

And so, to the extent that DOE can, in what they fund, move that dial farther towards the ideal point on the dial, it would be helpful to everyone involved because we really cannot see these things only through the silos in which we live, not even within the state, but certainly not between the states.

And the large square and rectangle states out where you are do a better job of this, frankly --

MR. CURRY: Much better.

MR. BUTLER: -- than we do on the east coast. Even though we've had things like PJM, and ISO, and et cetera, for decades, we still tend to be in our silos way too much.

MS. GRUENEICH: One of the parts that I, as -- if we are going to get into this in future meetings and are thinking about that I think has been of great value from the funding is identifying missing technical data.

And, for example, in the west, just getting a common base inventory collected from the state governments of the wildlife, of the threatened species, seeing endangered species, some idea of water usage at the power plants. Those are the types of data-building efforts that, to me, are sort of front and center of what a national Department of Energy is helping us as a country have good solid information on.

Getting together -- you know, I think you were at the meeting where we talked about with the foundational transmission lines in the west. Nobody had thought to gather the information on,

okay, so how much renewable are they projected to actually carry and communicate that to the group because otherwise it was this amazing effort that had no correlation to understanding how it was then going to meet State RPS goals and systematically having that information available.

So I just wanted to throw out that to me, as we're thinking about that, it's -- it is much more than bringing people together and talking. It is DOE having provided good, solid, technical information and databases. And I think going forward that's an important question to ask and to think about between the three interconnections what data has been collected and what ended up being useful. What is the cost of maintaining or expanding those databases?

MR. KRAPELS: Yeah, this is a similar question. When you actually start building transmission, the people you run into, including the state regulators, are also folks like the Forest Service. As we go offshore, it's people like DOI, who I had a meeting with yesterday. At

the state level, it's the environmental commissions who will make the call on whether water can be used in a particular nuclear power plant. And this is just a question. I'm not involved in EIPC. Are those folks represented in the analysis and in the study?

MR. MEYER: Yes, definitely, and more so in the west than in the east because of the greater prevalence of federal lands in the west, although Interior is quite interested in offshore so far as the east is concerned.

The one party that I would say that's absent, at least to a greater degree than we would like, is the Defense Department. And they -- obviously, they own a huge amount of real estate. They typically come to the party too late when it comes to the development of some kind of facility, and they wave their arms and say, "Oh, you know, you can't do that because it's going to interfere with X, Y, Z."

And yet when we talk to some of those people they say, "Yeah, we sure would like to be

there, but we're just not geared up. We don't have the horsepower staff-wise yet to do it." And maybe they will in future. But we've learned a lot.

I mean, the feds -- the other federal agencies seem to -- in fact, it was interesting that we have been telling some of our senior people about this effort for some time, but what really got their attention was when BLM and Forest Service were coming in and saying, "Do you guys know how terrific this stuff is?" That -- that kind of made a difference for them, yeah. So --

MR. COWART: Can I just make a comment?

MR. MEYER: Sure.

MR. COWART: It sounds to me like there's been -- and you've been taking notes, I assume -- that a lot of good input, like, from this conversation for the Subcommittee and -- but no one has yet raised the question -- actually answered the last sentence which is how would you propose -- I heard all these great things about

the value of these processes for different reasons and no suggestions on how you would propose to make sure the funding continues to make it possible. And that's fine for today.

I mean, that's the job of the Subcommittee to come up with ideas, but perhaps we want to just toss that one out explicitly right now and see does anybody have a suggestion that you'd want the Subcommittee to examine?

Go ahead.

MS. AZAR: Well, I come to use MISO as an example where MISO ends up funding the organization of MISO states. And similarly, PJM funds OPSI.

(Comment by Mr. Curry off microphone was inaudible and not transcribed.)

(Laughter.)

UNIDENTIFIED MALE SPEAKER: Bah-dum-bum.

OTHER UNIDENTIFIED MALE SPEAKER: Four to one vote in New York.

MS. AZAR: So I think there is a model there for a lot of the Eastern Interconnect at

least. We do have some challenges in the Southeast as far as how we could collect funds from them.

But I do think with regards to the majority of the Eastern Interconnect, I think we could find a mechanism through similar types of funding.

For the West where you guys don't have RTOs, I'm not sure how east that's going to be. I think with ERCOT it's going to be pretty easy but --

MS. GRUENEICH: It's been discussed. It would be through WECC.

MS. AZAR: It would be through WECC. Okay.

MR. GRUENEICH: Yeah. The difficulty, as I said, I think whenever you get into this, you want to break it down into categories of funding because they were quite different. You know, funding state officials to travel versus acquiring a new database, but the discussions have been it would ultimately be funded through

WECC.

MR. SLOAN: Yeah, I'll pickup and build on what Lauren and Dian said.

Essentially whether you're having sponsored workshops as you are with that -- the transmission workshop next month in Denver or whether you partner with NERUC, NCSL, CSG, some other organizations, NGA, to bring people to conferences where DOE is sponsoring a workshop or a panel discussion, rather, or even within the industries. You know, Brad's invited me to the ESA meeting which I now can't go to but, you know, the education of Commissioners and selected legislators -- I mean, you don't want everybody there -- you know, is crucial to moving public policy forward. You can have the best ideas, the best technologies, but if I don't permit you to use them or to recover your costs because I don't understand it, you know, we're not going to go very far very fast.

I mean, I've been a big advocate of we have to reward first adopters, but that's not a

subject that shows up at any of my legislative conferences and such. It's think meetings that I, you know, I'm coming to like this one. So, again, it comes down to not, frankly, whether it's industry supported scholarships, whether it's the RTO, ISO, WECC supported scholarships, or whether it's just DOE money that's funneled through, they've got to get us together, as Fred said, and avoid the silos.

MR. POPOWSKY: Just a narrow point in response to Lauren. PJM doesn't fund consumer advocates or NGOs. In fact, we've tried to get funding, and I'm unable to do that. And the reason we're able to participate in the EIPC is because DOE made is clear from the beginning that they wanted to have representation from consumers and from NGOs.

So we certainly appreciate that support, but I just wanted to point that out, Lauren, that we need something broader than the -- what's been going on at the RTOs.

MR. MOHRE: I have a couple thoughts

here. One is you've got to keep on keeping on with this. It's been going on almost as long as the interstate highway system. I will point out I was 6-foot, 8 when I tried. And look what's happened.

But the -- I think there's a group missing in the Item one. And it's one thing to plan and do analysis. It's another thing to get the right-of-ways. And, quite candidly, even when you plan a line, there is a problem getting the federal agencies to talk to each other and buy in. And it seems to me -- and I realize you can't tell another federal agency what to do. And I realize there was some legislation that talked about fixing that problem, but we still have it today. And we have it in spades when we try to build a transmission line.

And it involves -- I don't want to get into the agencies. I'll tell you off line, but it seems to me that particularly where you're doing planning in an area where there are federal agencies involved, okay, somehow we've got to get

their attention that this is important and they don't go out and sell their wares by saying sign up with us and if you do, we'll make sure transmission lines don't get built. And I say, we'll talk off line about that.

MR. MEYER: I can speak briefly to that particular problem. That is one of the -- the states and the industry alike are somewhat uncomfortable at the list -- at the uses we feds have made of a couple of lists that they've come up with -- lists of projects.

That is, the modelers, when they do these long-term forecasts, what they have to ask themselves are what are some of the projects that are not yet operational but in the pipeline that we expect are going to come on line during the study period -- that we think are very likely to come on line during the study period? And those kinds of projects need to go into sort of what the base case, or the reference case, or whatever you would call it.

Projects that are more speculative, you

want to put into the scenarios that you're going to compare with the base case. Now, both in the east and in the west now, the working groups have come up with these lists of projects that were to go into the base case that were believed to be comparatively likely to come on line.

And so we then -- that is DOE, and Interior, and Forest Service, and others -- have said, okay. Those lists are very useful to us because they help us prioritize attention, say, within the Forest Service about what -- what projects -- and, you know, we've had the Secretary of Agriculture say, I don't want a list of 25 projects. I want a list of five or six projects that I can tell my people, hey, pay attention to this. I'm not telling you how to rule, how to make the decision, but make sure that this gets attention. Make sure if you have data problems that need to be addressed, tell me about it. If you have coordination problems with other agencies, tell me about it, but stay on schedule.

So this is a -- we're using different parts of this process to leverage each other. And I think it's very productive. And it -- I would love to be able to bring the Defense Department into this conversation more because I think that would be very helpful.

(comment off microphone was inaudible and not transcribed.)

MR. MEYER: Sure. Rich is reminding me we need to move on.

Yeah, Item 2. In -- when we issued the request for proposals under -- for the Recovery Act money, we listed about four or five core objectives that we thought the planners should be seeking to balance.

But when the Recovery Act money runs out and if this process is ongoing, what are the planners going to plan for? What should they plan for?

This is an important set of variables to be thinking about here. And it -- so I'll stop there and let people respond.

MR. KRAPELS: I think FERC has done a very useful job in pointing to some things in the NOPER that is currently under consideration. And I believe they said we will look at state policies, environmental policies, and we will try to implement transmission planning and transmission procedures that help the states achieve what they want to achieve, and obviously how they actually do that is going to be of great interest to us.

They had a second issue that they defined. And it's almost a policy objective. They didn't quite put it that way but I wondered if this committee would like to embrace it as a policy objective. And that is greater regional integration.

The Eastern Interconnect is not well integrated. The Commission seemed -- and, Joe, I'd love your thoughts on this -- whether FERC seems to look at the integration of different control areas as a public policy good that it tries to facilitate. The Commission's been very

helpful to our projects. We tend to be interregional projects focused because they're difficult to do, and utilities don't typically do them. So those are two possible candidates for us.

MR. HEYECK: I just want to -- I'm trying to figure out if the Department of Energy could carve out a piece that's not being done. Right now planning is being done by many. And if you have to think about what to carve out, I would say certainly engaging Homeland Security, Department of Defense, the security of our grid, not just from a cyber perspective but physical. And then determining what's RAYPARE [phonetic], what's really national defense, resiliency.

Those are the things that are not being done today by RTOs. And I really think RTOs are doing a good job. You did carve out a value add in our first discussion, that being there are more people at the table. And I -- that's good. Everyone can get an understanding as to what needs to be done.

But I really think we need to carve out what it is that -- as you had in the Item 1 as the value add. And I really think the value add is let's give the planners -- they're doing a good job. FERC does have some action along the three pillars of policy, reliability, and efficiency, congestion. So let's give that a chance to work.

I'm intrigued by your notion of the Department of Defense. I think I would add Homeland Security. And I'm wondering if that is more of a separate effort than getting mired in the effort that has many stakeholders at the table.

MR. van WELIE: I think Mike has a good idea there.

My perspective on this really comes from having to do the planning ultimately. And I am nervous about this one because I think the only public policy requirement that's clearly defined at the moment is reliability. So the last thing you want to do is give planners an ambiguous set

of criteria to go and plan for.

And it may be that in single state ISOs they can get that from the state officials of that state, but the minute you're in a multi-state mode with conflicting requirements in each one of the states, and an absence of direction from a federal level, you're essentially giving a planner something that's impossible to do.

So I don't know how this committee can actually provide advice on this issue to be honest with you.

MR. KELLIHER: I would have to say I agree with Gordon on that. I mean, but the second question was posed by FERC nine months ago, right, in their proposed rule. And they have a multi thousand page record on this very question. And it just seems starting to ask it now at DOE is not timely.

And what if you actually come up with a different answer than FERC in the end along a different time frame and a different answer, it just seems how is that helpful to anyone, really.

Hopefully, the final rule actually does -- at least in a categorical sense -- these categories -- things like Clean Air Act rules that might cause retirements or something that should be considered in planning -- not, you know, naming them but hopefully the final FERC rule actually identifies the public policies that planners have to consider and just doesn't throw a jump ball in each region and say, you guys settle on what the scope of public policy needs to be incorporated in planning and that varies from region to region. That, I think, would be a pretty bad outcome.

But I just think from a DOE context this probably isn't a helpful question to ask or answer.

MR. van WELIE: And just to add something to that, Joe, I think the issue really is you don't want the planners to be trying to discern public policy. They need to be given something quite clear.

From a New England point of view we

punted on that and said let NESCO, which is our state committee on electricity, decide. Once they decide what the regional public policy is that we need to solve for, we'll do it.

But I don't think you want to put planners in the mode of trying to balance something that's not -- unbalance-able.

MS. AZAR: When I agreed to take on this committee, the subcommittee, one of my questions was or conditions were that one of the first questions we ask is who should be answering this question. And it needs to be okay for us to say not DOE.

And it -- this is an example of -- when I read this question, I didn't think the proper place was DOE either, but I think the Committee can help to the extent we think it's solely at FERC. Let's just say we think it's solely at FERC, or perhaps we need to say, you know what? We need some other stakeholder group. We need somebody else to take a look at this. We need Congress to step in, whatever the case may be.

Or we may decide, as a Subcommittee, not to attack this issue at all.

But I just wanted to let you know it's okay to say not DOE.

MR. COWART: I'm going to echo that. It doesn't necessarily need to be DOE, although, we may want to, in fact, recommend a planning process or we might, you know, individually favor a planning process that looked at more than reliability.

I mean, I'm aware that planning processes for interconnections, for example, ask questions like how can we minimize congestion and, therefore, reduce consumer costs. That's pretty common in planning processes.

Or we might say how can we ensure the interconnection of a larger fraction of renewable. Same thing, I mean, you know, it's not like we don't do this already and have multiple objectives.

The question as to whether DOE should be making up that list or whether we would want to

allow the planning processes that we just discussed for a good while in Topic 1 to, you know, empower them to come up with their planning objectives as part of their process, that's a separate -- or whether we say, as Lauren just said, maybe we are content to let FERC do it or Congress do it.

I do think -- I would just observe that having a planning process for large scale systems integration that only looks at reliability, to me, doesn't advance the nation's long-term objectives. So I -- I doubt we will want to end up there.

MR. MEYER: Anything further on Item 2? Seeing none, we will go on to Item 3.

The right-sizing issue is one that has come up frequently in discussions that I've had with people. They are very keenly aware that you may only get one shot at this -- at building a line in a given area. And so it's extremely important to try to get it right. And so, that leads to a series of questions which are the

bullets here.

And in the interest of time I won't go through them one by one. I'll let folks comment as they think appropriate. Mike, you had your card up first.

MR. HEYECK: This is like the Jeopardy game. We have to hit the button.

Let me -- as a proponent of higher voltage transmission 765-kV, for example, versus 345-kV. There's a place for each of these elements. It's not one-size-fits-all that -- perhaps Wisconsin doesn't need a 765-kV circuit but maybe West Virginia does. It really is an element-by-element proposition.

The issue then becomes what you -- you know, the up-front cost versus the life of it. So if you put a 345-kV double circuit tower up string one side, then string the other side five years from now, and then 10 years from now reconductor it, and then 15 years from now actually tear it down and put a higher voltage transmission, I would say that that's not going

to be hard to figure out that that's going to be more costly than actually building it right the first time.

However, I am -- I am accountable, and I understand the issue on rates -- the impact on rates.

But there's another part of this grid that we haven't really figured out. And we waste 350 billion kilowatt hours per year in delivery -- 350 billion kilowatt hours in delivery. And we do a lot of stupid things by loading up lower voltage facilities to their rating all the -- much more time than it should be. And that wastes a lot of losses. In fact, you can get up to 9 percent even on a 345-kV circuit. So the efficiency of the grid's got to be looked at as well. And actually, we could do simple things in substations, existing substations, on efficiency.

But getting back to the subject at hand, I think this is going to be an element-by-element proposition. If you look at DC versus AC, again, it's application and where it is in the network.

DC has very strong opportunity underground in urban areas, along interstates. Long-distance DC is certainly efficient, but the states in between don't want to see it because they don't get the off ramps.

So, what I'm saying is each of these propositions will make themselves evident in a planning process. But there can be an economic model run to see what if you do this, this, and this, up-front costs versus ongoing costs. You can do that, but that's an academic exercise in my estimation.

So, again, I'm an advocate for high voltage transmission because of efficiency and the fact that there is many more unknowns that when you put the lineup that you have to endure such as generation at risk.

MR. DELGADO: I will add to what Mike said, which I think is quite -- quite well.

And it has to do with the fact that the industry has some practices which are, I would say differing in different places, but this is

not new to us. The fact is that you never build a line that gets fully loaded the day you turn the switch. You always have excessive capacity. It's part of the plan. You always put a problem way out of the way. You don't plan -- build transmission for to solve the problem just two years. You solve the problem for the next 15, 20 years, okay. And this is part of transmission.

A transmission line does not become stranded simply because the flow is low. The only way I can think of is stranded transmission if you built a line to some load that never appears and it's a single radial, and nobody wants to pay that because they have no use whatsoever -- the load that doesn't show up.

I know very few cases of that, and most of us would never build anything like that. We would just go and (unintelligible) to the thing that's always useful.

So the issue of capacity -- like Mike said, transmission lines that have an empty side, double circuit without a circuit. Whether that

base or not, everybody does a present worth. And very often we do not know the rate of growth of load, and sometimes -- or most often we are wrong. It is too fast or too slow.

So what we do is basically try to determine our best case of the present worth of doing it 15 years from now. You should know that we have the ability because we have done it to actually replace a line while it's still running. Okay? I mean, it's dicey. The equipment is expensive, but we have done it. 345-kV line replace while it's running -- new (unintelligible), new wires and the line is running. Yeah, it makes the hair in the back of your head go straight and may give you bad nights, and you don't want to watch it, but can it be done? When it's worth it, yes.

If the line -- an hour of the line costs you $2 million in re-dispatch. You can afford to pay a lot of money to replace that sucker. So, when there is a need, there is a drive.

There are right-of-ways that I think it

would pay to do what I think -- what I was thought in the past is that we do need some broader right-of-ways. And also, we have to come to a conclusion that we have to use multiple uses for right-of-ways. Sometimes -- it was canceling for a long time the highway the permit. They don't want us to put lines next to it because it made their highways ugly. Okay?

(Laughter.)

MR. DELGADO: But then the legislature passed --

MS. AZAR: What's your point, José?

MR. DELGADO: Well, you know, I -- I, you know, when an engineer tells to me about beauty, I say, "Great. When is the last --" well, anyways.

(Laughter.)

MR. DELGADO: But the issue is -- and finally the legislature passed a law that listed the double use of right-of-way and highway was the first one they order us to put them in. Why? Because it makes sense, folks. It's already

there. And, you know, a six-lane highway on the south of Madison is not going to get any uglier. The case has been already decided, so I'm not compromising your -- because we built a 345 next to it. Okay? But you should see the emotions that get involved in this.

The point, folks, is that there -- there's traditions the industry have used in this. The question then comes if, in fact, we need a very large investment to go across the state, which Mike is very familiar with this, where the needs, the sources and the syncs, the needs are in both ends. How do we compensate the people in the state so they don't end up with the cost probably at minimal benefit. And those are things that we have to decide as a matter of money.

The issue of expandability, we have been dealing with that for a very long time. There are critical right-of-ways, so I'm not going to say that we can ignore it in any case. We have to look at it.

I'm particularly concerned with right-of-ways into heavily populated areas where, in fact, the right-of-ways that exist are being over built carelessly, and you're not thinking of the variety of infrastructure. This is a matter of city planning, you know.

We very frequently have had issues with development groups in counties where they have this whole park, and then we come and say, "Well, where is the right-of-way for the transmission line?"

And they say, "What transmission line?"

And say, "Well, all this industry, what is it going to run on? Electricity?"

Oh. You know, please remember you've got to leave a crack for us to get through. Okay. So I think that it -- we have a role -- the Commissions have a role. The most important issue which we -- it's kind of an expansion of this is what happens when we have to cross a corner of a state to serve folks someplace else? That continues to be the issue that bedevils the

industry.

And sometimes what we have done is we say the local state doesn't pay anything. The one that doesn't get the benefit doesn't pay anything. We have done it with one line in Wisconsin. I know that people don't like it, but the fact that Minnesota didn't pay anything for Arrowhead West and even though it ends there. Okay. Because the bulk of the needs was in Wisconsin.

But those are issues that have to be discussed. My impression is that we have the technology and the experience to sort of build and build in place and continue expanding in place.

MR. MEYER: My understanding is that this right-sizing issue has been made more acute by the prospect of the long-term development of large amounts of renewable and that, say, in the case of meeting state level RPSs, to meet that RPS as now written, it might take a Size X line, but if the -- if you're talking about a resource-

rich area that potentially could be developing a lot more later on, that's when this right-sizing issue becomes more difficult now than -- than it might have been earlier. Yeah, so sure.

MR. van WELIE: So, David, the engineer in me likes the idea of while you're sort of doing the surgery, you do an all-in-one shot and you spend the money to put in place a decent solution that'll last you a long time.

But I think -- I'm doubtful that any study attempt that we or the DOE could do in this area will be of much use until you solve the items in 2 because this is essentially a public policy problem. And there's a great case study that's just occurring as we speak up in New England that illustrates the point.

There's -- I had said that the only public policy requirement that's clear at the moment for planners is reliability. And I think we've used that to good effect in New England to deal with a lot of investment that was needed for reliability in New England. And when you take

the transmission line to the siting authority, believe me, they take you through your paces in terms of demonstrating how and why it's necessary to make this investment in order to meet that need.

In Maine there's a $1.4 billion project that's just gone into construction that went through our planning process. And there's a section of that line which we're building at a 115-kV. It actually makes more sense to build it at 345-kV, but the reliability case isn't there.

If you look about -- if you look at the investment that's been made in the long term and you assume a lot of wind integration up in Maine, you would -- and if somebody were to say, "We're going to do that," from a public policy point of view, you would have built that line at 345-kV, not at 115-kV.

But in this case the decisional authority was the Maine Public Utility Commission. They have the signing authority. And essentially what they were looking at was a narrow requirement,

which is you, ISO, and Central Maine Power, say you need this line in order to maintain reliability. What's the minimum amount you have to spend in order to achieve that objective?

And with respect to the rest of the region who has to pay their fair share of this line, people would ask the same question. So, because we have environmental policy unresolved, effectively, you can't even have a productive discussion about this issue.

So, perhaps through the FERC NOPER they opened the door for the states to weigh in on what public policy is. And then the planners will get clarity as to how to go from there. I'm not confident we will get -- we'll make much progress in this forum on this issue.

MR. WEEDALL: So I'm going to echo a lot of what Gordon just said. Certainly another driver that many of you have heard me, you know, talk about today, you know, during breaks, et cetera, is the scrutiny that we're coming under is just unprecedented. You know, as I've talked

to -- when you have a public meeting and 600 people show up and they're very well organized, and they're very well informed, and very well represented, it's just very hard for me to look here and start to say, "Yeah, go ahead and over build the thing." You know, they're -- again, the scrutiny is just there.

You know, of course, you know, we -- we're in some ways our own worst enemy because, you know, we're very transparent, or we try to be transparent. And we have a non-wires process. And, you know, again the detail is there. You know, we're trying to skinny down the investments that we make also because it's our capital, and, you know, again, we've got to make sure it's the very best investment.

So I just look at this and think -- especially going forward when people have more ability to push back, and you know, whether it's social networking or other, you know, ways that people are bringing, you know, different points of view to the discussion. I just think it's

going to be more and more difficult for us, and we've got to put the very best case forward as to why that investment makes sense and --

MS. GRUENEICH: I'm going to be a bit of the skunk here. And even though I know it does say potential study topics that actually 2 radically suggests 3, 4, and 5 not be addressed by the Transmission Subcommittee. So I'll just lay it out, and I recognize DOE is going to decide, but this gets back to -- this is an Advisory Committee to DOE.

DOE has no legal jurisdiction over the sizing or siting of transmission lines. And so, to provide advice to DOE on whether lines in general should be made larger or not seems to me to be a bit of an academic exercise.

As a Commissioner I spent six years overseeing the successful permitting of transmission lines -- three major ones all permitted and all under construction.

And when it comes down to super-sizing, it is absolutely dependent upon the line itself.

And I -- I'll just be honest. I feel like we could have a lot of discussion of some general theories should you, you know, build larger or not larger, but the reality is that there will be millions if not billions of dollars at stake in the issue, and it will be dependent upon the project. So that's the right-of-ways.

I'll just quickly go to this fourth and fifth since I know we're going to move on. The fourth I think is squarely at issue before FERC, so why should we all discuss positions that probably all of our organizations have already submitted it to FERC and we're waiting to happen.

And the fifth -- my memory is is that that's a legal issue that is state specific, which, again, providing advice to DOE on what I guess DOE would then turn around and start telling states, "You should change your state law." You know, I don't think we want to go -- so I'm just saying we should -- we should probably -- if we're going to take these on -- hone in a little bit more on how our time

advising DOE is going to help DOE in its decision making because that's - that's how I think fundamentally we're trying to assist DOE in this committee.

MR. COWART: Okay. Let me --

MS. GRUENEICH: So I told you I was going to be the skunk.

MR. COWART: I understand. Let me say that I think to look at what is in DOE's jurisdiction, if you like, is a mistake. That is, DOE does have a policy function at the interagency level where -- in working with the White House or others. We have a capacity to turn to the National Laboratories and ask them to focus on questions that are of particular interest or value to the states, say.

And, you know, it wasn't very long ago when we were hearing from lots of different sources that there were three fundamental problem areas with respect to transmission: planning, cost allocation, and siting. And not that those three are necessarily the only way to -- the only

typology to use, but in any event, my point is that from my point of view as a -- working at DOE on transmission policy questions, my fundamental question to myself is, all right, what are the fundamental issues here. And what can DOE do that would be a useful contribution to the dialog?

And if we can provide -- if we can facilitate a more intelligent conversation on any of these subjects, fine. That's what -- that's worth doing. And we're not trying to get into somebody else's jurisdiction. We recognize people's -- other people have very specific authorities, and we respect that, but nonetheless, we think we can find ways to help deal with the most acute issues. And that's our objective.

So, let's turn with what time we have left to Number 4 and Number 5. And Number 4 is unquestionably a hugely important issue. And to say that FERC is dealing with it, yes, they're dealing with it. They've been dealing with it

for some while. And so I -- whether they will succeed this time around or not, I don't know, but if there are some useful ways to -- creative ways to deal with this, I think it's well worthwhile to give attention to them.

MR. KRAPELS: I think 4 and 5 are pretty much related issues. And when we were foolish enough to initially get started in transmission development, we knew we didn't have imminent domain. And so when we look at transmission projects, we always say, "What can we do," and, "What can we use where we don't have that authority?" And compensation is one way to solve that problem.

For example, we are looking at a Hudson River project. And compensating the river for what we're going to do to it is actually a good thing with creating a fund for Hudson River repair and restoration once the cable is buried is an idea that's so sensible to me that R. H. Coase could have written about it and applauded it.

So I think anything the Department can do to legitimize this idea that bodies of water or rights-of-way are things that are being used or people are inconvenienced deserve to be compensate is a big step forward.

MR. KELLIHER: I guess I share some of Dian's concerns about 4 and 5. And 4, again, is -- the benefits issue is something FERC asked nine months ago, multi-thousand-page record. They're poised to issue a final rule in a month, two months. Is there any possibility that the Electricity Advisory Committee in the next month will have a eureka solution to the benefits issue that has eluded everyone actively participating in the proceeding to date?

I suppose it's possible. I don't want to --

MS. AZAR: I've been keeping it a secret. I'll tell everybody later.

MR. KELLIHER: Well, yeah. And so that's one where it just seems it's arguably too late to ask the question, right? Because there would be

some period of time -- let's assume we actually agreed on what the answer was. We'd agree probably months after FERC issues a final rule, and depending on how they answer that -- the benefit principal question in the final rule -- they've either decided it or they handed it off to regions.

And then is DOE advising regions -- and regions still isn't very defined in the FERC proposed rule. It just seems like it's arguably too late to ask the question in this -- in this body, Question 4.

And 5, until and unless federal siting becomes a reality, that is a, I think -- a state and a local consideration. And it seems like an academic exercise to basically in the abstract say the best, the optimal right-of-way compensation scheme is X. Issue a report, and maybe we're exactly right, and maybe we're very persuasive. What's the value of that report? It is of slight value unless it's sent to every state siting body and every local siting body in

states like New Jersey where there isn't a state siting body.

And it just seems -- the report by itself would have an academic value unless there's going to be an attempt to persuade the state and local siting bodies, the multitude of them, that they should change their compensation scheme to reflect the ideal. And is that really what the Committee should be doing?

MR. POPOWSKY: Yeah, I was going to agree with Dian, I guess, in particular on Number 3 and 5. I think Number 3 the right sizing seems to me the kind of thing people like José have been doing for 30 years and is a fairly technical question that has to be decided on a case-by-case basis.

And Number 5, I agree with Joe, is an intensely local issue. I mean, that's what we've found in Pennsylvania. I mean, when it gets down to the siting on that right-of-way, it's -- it's house-by-house, farm-by-farm, historic site-by-historic site.

So I tend to think, though, that Number 4 -- and then even going back to Number 2 -- are at least the kind of issues that a group like this could contribute on. Maybe Number 2 is -- if I could just go back to that for a minute, it's -- if we -- the question I think is what -- instead of what broad public policy objectives should be considered, maybe we should say what national public policy objectives should be considered by the regional planners and by state planners. What are the national objectives that we should be -- that we, as a group, could contribute to this process because -- and just finally, when you get to both Number 2 and Number 4, what's been frustrating to me, I guess, like when I got into the EIPC process, I really thought that the fundamental question was going to be how are we going to decide as a nation -- how are we as a nation going to deal with reducing carbon, and how do we do this on a national basis because it's so much harder to do it on a local and regional basis.

(Mr. Butler leaves the meeting.)

MR. POPOOWSKY: So, now unfortunately, that rug's been pulled out from under us, I guess, in terms of the carbon issue -- or maybe it has, maybe it hasn't, but to the extent we can identify positive national benefits, positive national attributes that we as a nation ought to be looking at in our local and regional parochial plans, maybe that would be helpful.

And I think that goes to both Number 2 and Number 4, so --

MR. SLOAN: I guess I disagree with the last few speakers. I think that these last three topics are worthy of our investment of our time and effort because I see the Department's role being that educator, facilitation process that I talked about earlier. And that is how do you get the state policy makers, the regional policy makers, the general public, the media to understand the significance that these are not necessary local issues, but they are larger in scope. I mean, they define what kind of energy

security, or reliability, resiliency, or whatever system we're going to have.

And so, for me, these may not be the same type of recommendations that we would sent to the Department as we would on 1 and 2, but we can certainly encourage the investment in that public education, that public dialog facilitation that I think we've talked about before.

MR. van WELIE: I tend to agree with Joe. I think this Committee will become a microcosm of what's playing out at the FERC right now. So I think it would be quite a frustrating discussion.

MR. COWART: Yeah, I actually have a mixed bag of reactions to these things. I'll try to remember -- to remember what's in the bag.

The -- first, I do believe that the Department of Energy has a public policy role, and so I wouldn't -- and that -- that consists, as David said, of advancing policies within the federal government to other agencies. It also consists of providing assistance to the states, and it consists also of supervising the work of

the labs.

(Mr. Bowen leaves the meeting.)

MR. COWART: And so there's actually a broader -- I wouldn't judge the role of this committee to be limited to those things over which the Department has some kind of either direct spending authority or direct regulatory jurisdiction.

That said, I agree with some of the comments about which is -- which things are closer to the core of our job advising the Department and which things might not be.

With respect to Item Number 3, I think I'll echo what Sonny just said that there are national policies implicit in these major infrastructure planning initiatives and that framing the question what are the national policies that we believe should be advanced in those planning processes is to me an appropriate way to position that question.

With respect to Number 5, I share the comment that that seems -- that seems pretty

narrow and not something that -- that I -- that sort of rises to the high level of concern for this group.

Now, Number 4 is really quite interesting because that's really a question for -- if you think of it in a federal system of government, it really is right there at the -- what's the -- the manner or what are the mechanisms by which we can accommodate competing state interests. And it is a generic issue that goes to the ability to create a grid that provides the public benefits widely that we want to see. And I think there are opportunities to be creative about that.

It may well be the case that the Department doesn't have jurisdiction to implement any of the recommendations or good ideas that we might come up with in Number 4.

I'm taken by the fact -- I mean, I am influenced here by the fact that FERC has a docket. And if FERC's going to be issuing something, then maybe we should put off our work until FERC issues it, and then we can see what we

think of it and what we want to do next.

But I am also aware that being creative about compensation to pass-through communities or pass-through states is actually going to be really important. Gordon's well aware of the example in New England of siting the -- I guess I get to echo Dian having sited transmission -- siting the HVDC line from Quebec into Central New England through New Hampshire and Vermont which weren't going to have any take-off points at all off of that line.

And so there had to be a creative solution to provide -- to make it politically possible to site that line through the pass-through states, there had to be a deal. And there was a very creative deal struck to provide compensation in the form of energy credits to those pass-through states.

And just having lived through it, I know that these problems can be solved, and we ought to be collecting a -- you know, a play book of good examples that might help get some -- get

some solutions on the ground.

So I can see a role. I don't know how much it's going to be needed after the FERC order comes out and maybe we just wait and see.

MR. DELGADO: On the assumption that, in fact, we're going to talk about it, I would say that Number 5 is extremely interesting and having had a lot to do with it, I would like to -- I always get -- like to focus on what is good policy. In the value of electricity carrier where the line has been proposed to me by many, many, many people who saw their future totally paved with gold. And I had many, many reasons why, in fact, that was very poor policy which I could easily go through it.

But the fact is that we do not know the value of the current going through our line because we don't even know who owns it. Okay?

So, from that perspective, the ownership -- this is not a toll way even though I call it a toll way like Mike does. But anyways, the toll way every car has a driver that is accountable

for the car. Here we don't have it.

And there is such a thing as, you know, compensating appropriately. One thing that we have done that I have experience with is a law that we promoted helped, which is that anything over 345 and above we actually contribute a certain percentage of the total construction to each county, each community that we go by.

And all (unintelligible) is for a (unintelligible) rural community this is for a 345 or a 765, this is a humongous amount of money for them because these are communities very (unintelligible) territory, very few people. Their budget is extremely small. And, you know, to them this is a tremendous amount of money.

Now to the project which is a multimillion dollar project, frankly, it's relatively small to the point that it can easily justify to the counties. I'm going to tell you there's a whole portion of the county which means everybody not directly affected by the location of the line is in favor of you once they

understand how much money they're going to make.

And it's not that you're bribing everybody. It's that you're actually providing a compensation that is the issue you're talking in Number 4. And it works extremely well.

It does not mean, however, that you can convince everybody. And one of the things that in transmission business you learn is that you cannot make an omelet without cracking eggs. It's impossible to please everybody.

(Laughter.)

MR. DELGADO: Anyway, you might as well forget about it. If you do not care to have enemies and hate mail, just don't get in this business. Somebody's going to hate your guts with passion and express it in ways which are very creative.

And you just have to admit the fact that that is the way life is. We cannot make everybody happy. Some people are incapable emotionally to be happy. Their parents couldn't make them happy. I'm not taking the obligation

to make them happy because they are unable to be happy.

So from that perspective, any attempt at pleasing everybody is extremely poor policy. I don't know if you would propose that, of course, but this issue on energy value is out of sight. You know, it is impossible to manage.

Actually, I think it's very inadequate, very poor policy.

MR. HEYECK: I just wanted to start at the beginning. It would be good if Peggy could excerpt the transmission section of that report to go over some of the issues that we addressed.

If we -- again, if we have to consider what the DOE should do, I think it's in the value add department. And I've mentioned the area of security. I mentioned the area of planning analytics. We are still doing planning very much the same way we did planning 30 years ago. We're using the same tools that we did then.

In fact, when I joined AEP in the '70's we were talking about stochastic techniques. I

developed a technique called probabilistic transfer capability technique in the early '80's. But we really don't use those as much as we used the deterministic criteria.

Now that's not really for this Advisory Committee. To me, that might be something that the DOE could take a look at.

I agree with all the comments that have been made, and I think that the report -- some of the fundamentals of -- of transmission that we shouldn't lose sight of is that there is much more to transmission than just the load flow planning technique.

One of the techniques that are not being accomplished by the $80 million is taking a look at what Dave described earlier -- the inner-area phenomena that occurs. We missed that because our grid right now is on an EMS system that looks at only every two or three-second snapshots of what goes on in our interconnected system.

So the other area that the DOE could look at which actually links up with synchrophasors is

developing the next generation EMS system to deal with intermittency, to deal with the issue that -- - of Just In Time.

So those are the things that the DOE can do. I'm not sure this Committee needs to be involved in designing the next EMS system or at least encouraging it. So, from my perspective, I'd just like to make sure that we do that which is not being done, which I think it's been echoed around here.

MR. MEYER: Let me speak to -- respond to some of that, that is, Pat's office does have a very substantial R and D program. And some of these real time or near real time grid management challenges are certainly very much on our screen.

So at some point I expect we will have people from the office in talking to the group about some of those projects, what -- we would certainly want to get your input on what you thought the priority things to focus on are and match that up with the kind -- the work that we have under way. So, that's -- it's certainly a

subject to be explored.

MR. COWART: So any other comments on any of these topics?

MS. GRUENEICH: I had one item --

MR. COWART: Or addition -- yeah, totally different things that you'd like to put in front of the Subcommittee?

MS. GRUENEICH: One of the areas that I worried a great deal about when I was overseeing the permitting of the new transmission lines in California was because we were in real time, we never stepped back and said, "Are the actual physical materials on the lines the most advanced?"

And over time I've had folks coming to me and say, "Hey, we've got a great new product, new technology," and that's something that I wonder if there isn't a way to address it and think about it and understand it because, again, I worry that whatever is the R and D that is being done with the demonstration on just better materials and maybe better physical building of

the lines, how well is that getting dispersed out into the actual new lines.

And there is, of course, a great hesitancy for state commissioners to say, "Okay, we're going to try something new," when it's a billion dollar project. I was never willing to do it, and I was about as risk-takey as you could get. And so I worry, again, that there is no systematic way of thinking about do we have some demonstration projects going on that that information is then shared.

So I don't know if you've thought about it already. I just wanted to pass on that was a worry that I always had.

MR. HEYECK: If I could answer, I'm on the -- I head up the Transmission Committee at EPRI. We do a lot of demonstration projects of composite core conductor, for example. Yeah, we still buy a conductor the same way we bought a conductor when Dave Nevius was 10 years old.

(Laughter.)

MR. HEYECK: But we do have some R and D

efforts there, but I think your question brings up that it might be well worth it in one of our meetings to have a presentation on some of the R and D topics for the industry.

MR. ROBERTS: And back to that whole right-sizing issue and everything, I mean, the consideration now of storage as a part of that whole process in this whole planning effort needs to now take place because I think there's a place for it in that whole issue.

MR. COWART: Lauren, do you want to --

MS. AZAR: Yeah -- no, I -- this was a great discussion and just demonstrated how noncontroversial this committee's going to be. What I think I will probably do is we'll convene the committee, and I think our first order of business is going to decide what issue we will be addressing, and then we'll go from there. So, thank you.

(Comment by Ms. Grueneich off microphone was inaudible and not transcribed.)

MS. AZAR: I'm sorry? Delegate it to me?

MR. COWART: Folks, if conversation seems to have reached a natural stopping point, that's great.

As you know, at each of our committee meetings there is a formal opportunity for any member of the public who wishes to address the committee to do so for not more than five minutes each.

And I don't think anybody signed up to do that but I'm making sure of that by asking now.

And hearing no responses, then I conclude there are no public comments.

And let me ask the members of the Committee is there anything any of you wishes to put in front of the Committee at this point -- any further business?

All right. Let me, first, congratulate David, Pat Hoffman, and the various presenters for their contributions. And once again, to let y'all know that I love coming to these meetings and listening to you and sharing ideas with y'all. Thank you very much.

We're adjourned.

(Whereupon, at 3:34 p.m., the Electricity Advisory Committee Meeting was adjourned.)