UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY

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ELECTRICITY ADVISORY COMMITTEE

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MEETING

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WEDNESDAY
OCTOBER 19, 2011
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The Electricity Advisory Committee met in the Conference Center of the National Rural Electric Cooperative Association Headquarters, 4301 Wilson Boulevard, Arlington, Virginia, at 2:00 p.m., Richard Cowart, Chair, presiding.

MEMBERS PRESENT

RICHARD COWART, Regulatory Assistance Project, Chair
THE HONORABLE ROBERT CURRY, New York State Public Service Commission
JOSE DELGADO, American Transmission Company

(Ret.)
ROGER DUNCAN, Austin Energy (Ret.)
ROBERT GRAMLICH, American Wind Energy Association
MICHAEL HEYECK, American Electric Power
JOSEPH KELLIHER, NextEra Energy, Inc.
EDWARD KRAPELS, Anbaric Holdings

RALPH MASIELLO, KEMA
RICH MEYER, National Rural Electric Cooperative Association, for Barry Lawson

DAVID NEVIUS, North American Electric Reliability Corporation
IRWIN POPOWSKY, Pennsylvania Consumer Advocate
WANDA REDER, S&C Electric Company
BRAD ROBERTS, Electricity Storage Association
THE HONORABLE TOM SLOAN, Kansas House of Representatives
GORDON van WELIE, Independent System Operator of New England
MIKE WEEDALL, Bonneville Energy Administration
BRIAN WYNNE, Electric Drive Transportation Association

PRESENT FROM THE DEPARTMENT OF ENERGY
PATRICIA HOFFMAN, Assistant Secretary for Electricity Delivery and Energy Reliability
DAVID ANDERSON, Office of Energy Efficiency and Renewable Energy
CAITLIN CALLAGHAN, ORISE Fellow, Office of Electricity Delivery and Energy Reliability
KERRY CHEUNG, Office of Electricity Delivery and Energy Reliability
GRAHAM COATES, Extern
LOT COOKE, Office of General Counsel
BILL PARKS, Senior Advisory, Office of Electricity Delivery and Energy Reliability
HANK KENCHINGTON, Deputy Assistant Secretary for R&D, Office of Electricity Delivery and Energy Reliability
DAVID MEYER, Office of Electricity Delivery and Energy Reliability

MATT ROSENBAUM, Office of Electricity Delivery and Energy Reliability
ENERGETICS STAFF PRESENT
CAMI DODGE
NATALIE KEMPKEY
KATIE SHAY

PEGGY WELSH

ALSO PRESENT

DEREK BANDERA, GenOn Energy

TOM BIALEK, Chief Engineer, Smart Grid,
San Diego Gas & Electric Company

JIM CREEVY, NEMA

JOHN HOWES, Redland Energy

WARREN LASHER, ERCOT

ROBERT LASSETER, Emeritus Professor, College
of Engineering, University of Wisconsin-
Madison

PHILIP MIHLMESTER, ICF International

DEBRA RAGGIO, GenOn Energy

JOHN SHENOT, Regulatory Assistance Project

MARY TOLER, Battelle

FRITZ WALKER, Air Products

C-O-N-T-E-N-T-S

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

2:08 p.m.

CHAIRMAN COWART: Good afternoon, folks. If the members of the committee would please take your seats. All right, good afternoon and welcome.

This is Richard Cowart of the Regulatory Assistance Project and this is the meeting of the Electricity Advisory Committee of the Department of Energy.

We are expecting Pat Hoffman to arrive in a few minutes, but I thought we should get going anyway. And one of the things we historically have done is to just allow people to introduce themselves as we go around the room.

And then we'll hear from our guests, as well. There's a, there will be an opportunity for members of the public, at then end of today's meeting, to make a public statement.

I think we'll set aside ten

minutes or so at the end. If there is anybody who, in that category, make yourself known to Peggy Welsh and we'll get you on the agenda.

So, as I said, this is Richard Cowart --

MS. WELSH: Remind people that this is being recorded, so people need to speak into the microphone.

CHAIRMAN COWART: And as in the past, these proceedings are being recorded and transcribed, so please make sure, members, when you're speaking, to speak clearly into the microphones, so the court reporter can understand what we're saying.

Let's just go around the room, going in this direction and then we'll go around the table and then hear from folks in the audience.

MR. PARKS: This is Bill Parks from the U.S. Department of Energy, Office of Electricity. Thanks for the chance to be here today.

MR. KRAPELS: Ed Krapels with Anbaric Transmission.

MR. KELLIHER: Joe Kelliher, NextEra Energy.

MR. HEYECK: Mike Heyeck, American Electric Power.

MR. GRAMLICH: Rob Gramlich, American Wind Energy Association.

MR. DUNCAN: Roger Duncan, Former General Manager of Austin Energy, currently with the University of Texas.

MR. DELGADO: Jose Delgado, Former President of the American Transmission Company.

MR. CURRY: Bob Curry, Public Service Commissioner from New York. As some of you have noticed, we started out with four Public Service Commissioners on this panel, and I'm the last one standing.

Whether there's anything to be read into that or not, I don't know. But I just thought I'd point it out. I think one

got promoted by going to DOE. Another got moved sideways to go to the Illinois, excuse me, to the Texas Railroad Commission and the third one went into private practice.

So there's hope for me someplace out there.

MR. WYNNE: Brian Wynne, with Electric Drive Transportation Association.

MR. WEEDALL: Mike Weedall, Bonneville Power.

MR. VAN WELIE: Gorton van Welie, ISO New England.

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

MR. ROBERTS: Brad Roberts, Electricity Storage Association.

MS. REDER: Wanda Reder, past President of IEEE-Power and Energy Society, and also with S&C Electric Company.

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

MR. NEVIUS: Dave Nevius, North

American Electric Reliability Corporation.

MR. R. MEYER: Rich Meyer, National Rural Electric Cooperative Association.

MR. MASIELLO: Ralph Masiello, KEMA.

MR. D. MEYER: David Meyer, Department of Energy.

SECRETARY HOFFMAN: So, let's start over there.

(Off mic introductions.)

MS. WELSH: Peggy Welsh, Energetics.

MR. ANDERSON: David Anderson, Department of Energy, Vehicle Technologies.

(Off mic introductions.)

CHAIRMAN COWART: All right, thank you very much. As you know, from looking at the agenda, we have over this afternoon and all day tomorrow, actually a great lineup of discussions, some pretty thorny and interesting topics.

And one of our other objectives of this meeting is to begin the committee's discussion of the topics that we should be taking up in our work plan for 2012.

One of the thoughts that the committee leadership has had, and the leadership team of the committee consists of the three Subcommittee Chairs, myself along with support from the Department and David Meyer and Peggy Welsh.

We've been discussing the dialogue between the committee and the department. And our unanimous desire to deepen and speed up the dialogue.

And one of the techniques for doing that really is, we're starting this afternoon, which is to begin with a very thoughtful vision statement of the Department's view of the future power grid, that Bill Parks is going to begin with, and lead us off with.

And then to ask ourselves the

questions, what does, what is that, where does that take us in terms of what the committee needs to do, both to advise the Department on steps that might be taken to actualize that vision or steps that might be taken to amend the vision.

And thinking concretely about the work of the three subcommittees, and also frankly thinking about things that might be beyond the work of the existing structure of the subcommittees for which we believe ought to be addressed anyway.

And we hope that that leads to a continuing process of advice and engagement with the Department that will bring to bear the really terrific expertise of the members of this committee in a more direct engagement with the Department.

And that's the launch for where we want to be in 2012, as we consider the work plan for this committee. So there will be a couple of steps involved in that.

One step is that the subcommittee Chairs will, together, come up with a list of ideas for consideration. We're going to solicit those, all members of the committee in a conversation around them and then we're going to come up with some concrete steps that we want to take.

Especially in the first half of 2012. Do you want to say something more about that process, David?

MR. D. MEYER: Well, one way that we can pursue this development of a 2012 work plan would be to get a list of good ideas, things that have come to mind to you, as individuals, or on your Subcommittees or something of that sort.

But it, say if we had ten really, what seem to be strong ideas, then we would, we at DOE, we would convene a group that would, ideally it would meet with the full committee but that may not be feasible.

But I'm thinking of appropriate

people from appropriate arms and legs of DOE. That is we seen and in the case of this recent draft paper, with respect to electric vehicles, it's important to connect with the people at the Department who are working on that topic, whatever it is.

Unless it's a topic where, for some mysterious reason, no one is actually focusing on it, then that's different. But, in general, we want to encourage more conversation up front, between the committee members and the relevant parts of DOE.

So that you start off with a much richer understanding of what has been thought about or what is the rationale for whatever DOE is currently doing in a particular area.

And we think that's a fruitful place to begin. But, at any rate, we would convene a group of appropriate DOE people, just to discuss the various items on the list, and help you narrow the list down to a manageable number.

So, that's one idea. It's not necessarily, you know, the final step in terms of how we'll manage this, but it's a good possibility.

CHAIRMAN COWART: All right, anything further on that topic? I'm looking at the Subcommittee Chairs to see if there's something you want to add right now about that. Okay.

That allows us to move directly to the substantive presentation by Bill Parks, which we should just get right into and welcome him.

Someone who is known to all of you, I'm sure. And it looks like he's ready.

MR. PARKS: Will it's great to see some of you again. Thank you for the chance to do this. I want to spend a couple of minutes actually before jumping into this, to give a little bit of context about why, what this is and what it isn't, a little bit to help that.

This is by no means a definitive end product. And we had one conversation with some planning group for February's NARUC meeting about some of this. And this is only the second time we've actually said anything that, this is actually the first public discussion of it all.

We wanted to bring that here. And what this is, is to understand a little bit about what the Department has been doing.

If you look at the past, really two years, the PCAST report came out and there was a Quadrennial Technology Review that Dr. Koonin led from the Office of Science, that was across DOE activity.

And that report has just come out in the last six weeks, and the appendices are still to come out, which talk about the technology areas covered by that.

In the grid case, there were three grid sections. And Kerry Cheung, who introduced himself, and I worked on that.

Hank Kenchington, who I think will be here in a little bit, worked on that, and Imre Gyuk from our office, as well as others across the Department worked on it, and across the labs worked on it.

And so that was one foundational piece. The other thing that has come in from the Secretary and Arun's viewpoint at ARPA-E and when Arun was acting Secretary, is to look at can we get more cross functionality at DOE?

So specifically, can we get ARPA-E and Science and OE and EERE working on the grid space, because of the issues that you see there right now.

And what are the ties ultimately to nuclear and fossil and the other programs. And so that was a focus of this. And so in the April time frame, a group of us were asked to come together.

Representatives from ARPA-E, from Science, from EE, ourselves actually from the CFO's office and to look at what, start

thinking some things about the grid from a holistically DOE standpoint, internally.

And recognize that this is the internal part of the discussion. And what I ultimately, myself, would like to do is, is start to move this out and discuss it publicly over the next six months and come up with what ultimately is a public/private vision.

Similar to what we did in 2003, when we did the vision for 2030. So that's where I would like this kind of thing to go and kind of the background of that. Any questions about that, before I start?

(No response.)

MR. PARKS: Plugging America into clean energy. So what we've seen, and I think this is important to say, that it's crucial in this space, as so many of you know, this is, that policies, markets and technologies be thought about at the same time.

That we cannot just, for example, have technology solutions that are wonderful,

and expect them to automatically change the space.

I think that that is not necessarily universally discussed, and I think it's critical that it be so. And, or that it be argued that that's not a valid thing to do.

And that the idea that we need to, and as we've tried to do in this office for a while, we need to blend how we look at all that and make sure that we are opening up markets or we are opening up the opportunity to move technology into that space as we think about our R&D portfolio, for example.

If you look at the left-hand side, the DOE Strategic Plan came out this year. Again, Dr. Koonin was involved in that and it was a cross DOE look.

On the grid side, overall, three goals jumped out early. Many other things are embedded in it. But on the grid side, there were really only three short-term goals that actually made the final product.

And I think that we all looked at that and said, that's not what we really want, if we're talking about a strategic plan. We want to think about where does this take us in the future and how do we get there and how do we incorporate the kind of thinking that we've been doing over the past year or year and a half.

This chart was first developed in 2001. And it was last modified in July. And it's been modified a number of times since then. Peggy.

MS. WELSH: Can you use the microphone.

MR. PARKS: Sorry, I want to wander and it doesn't allow me to do that very well. So, and it shows, the real purpose of this is it shows that there are a lot of viewpoints out there, not just our viewpoint, of what the future is going to look like.

And, thank you, Peggy, I appreciate it. It shows what the future is

going to look like. And what we really know in looking and backcasting a little bit, is we're not very good at predicting what that future scenario is going to be.

And, there is a lot of opportunity sets. So, I don't really know, as I stand here, what's a percentage of natural gas or nuclear or coal or renewables is going to be.

And I know that very much, had I had this discussion three years ago, I would hear a different set of what those percentages are and what I would hear today and three years back from that, a different set, yet.

And having been in this business a while, as many of you, we've seen ups and downs. We saw the natural gas bubble in the '90s, we saw, you know, push for clean coal in the '80s.

And so we know that these things wax and wane. If I look at the hydrogen fuel cell discussions over the last decade, certainly a lot of different predictions in

2002 versus 2008, if I look at that space.

So, I think the point is we really don't know. But we do know that it will change. And we know that there are degrees of uncertainty. And we know that there are things that seem to be evolving if you take those decade-long kind of looks of things and we seem to be saying we are seeing a changing supply mix.

We are seeing demand transformation, we are seeing the complexity of the grid expanding and how we're looking at it and the vulnerability of energy infrastructure.

What's happening in the cyber security space is pretty crucial. And so I think those trends are valid, telling you exactly what scenario, what percentage of any entity, I couldn't stand here and do it.

And so from that, if these trends are correct, then we will see a different grid at some point. And how can we be ready for

that.

And maybe more importantly, what are the commonalities that are kind of no regret things that we want to think about and do as we move forward. Because if I look at different scenarios, whether I pick a natural gas scenario or I pick a nuclear scenario.

Or I pick a demand response or efficiency scenario, some things come out no matter what. I think it's a pretty good bet to move toward some electrification of vehicles.

I think if you look at renewable penetration today, you have places that this year are hitting 40 percent wind penetration, or have hit it in the last few years.

They have a problem today. Now we may never get to 40 percent across the United States as an average, but the local conditions or situations may be that we probably better figure out how to do that pretty fast, because there are systems that are vulnerable today to

40 percent wind or 40 percent solar.

If you look at distribution circuits, PV in California and Hawaii, some of them are north of 50 percent solar PV penetration. Do we really know how to design circuits to do that?

So there's some, I believe a set of no regret kind of things that we should look at, or things that are truly breakthroughs, that if we could get them to happen, would change how we're going to look about this -- would change transmission planning, would change how we think about putting system together.

And we don't even have to get into arguing about what kind of market it's going to be in the future, but say that some of these things are really just going to happen no matter what.

So we were challenged by the Secretary to come up with a single vision for the grid. A single SunShot type thing would

have been ideal. A dollar a watt.

We failed to do that for the grid. How many people are shocked to hear that. We could not find a single metric that we thought was anywhere realistic about the entire grid space with things that could be handled.

So this is a work in progress. It's not a final thing. But these are some of the things that we thought as a team, over a couple of months and we worked at it.

And the idea that we -- can we enable a seamless cost-effective electricity system from generation to end use, capable of meeting the clean energy demands and capacity requirements of this century while allowing consumer participation and electricity used as desired, consumer choice. So the things that did, we thought factored into is the President's goal of a significant scale up of clean energy, broad definition of clean energy there of 80 percent.

So how can we talk about that

transition happening? Allow 100 percent consumer participation and choice in that, including the things shown there.

A holistically designed system capable of AC-DC hybrid configurations, and I'll talk a little bit more about that in a few minutes.

But the idea is, you know, when we first look at a vision in 2003, we talked about do we have a backbone, do we not, that debate continues.

The answers raised in my opinion, almost ten years ago, have not been answered. And so can we, as we think about offshore wind, as we think about, you know, the needs and the balance of how can we build that transmission.

You know, what can we do about reconfiguring and those kind of things. What is, can we come up with some path forward, especially that feeds back to our technical decisions about what kind of R&D do we fund.

And then maintain global competitiveness and leadership in the technology arena and not forget that we want a reliable, secure and resilient grid. And the idea that maybe the, you know, a vision of a grid that has changed.

You know the first 100, 120 years, we electrified this country, and that was extremely significant and extremely powerful for the development of the modern era and the stability of this country and economic growth of this country, was tremendous.

And, electricity as almost a commodity, because you can't store it, but available to the majority of Americans today.

What do we need it to be. We need to not lose those attributes of reliability and low cost and yet think of it, can we think maybe of electricity as a service. And now you talk about there is that choice and you are going to buy different packages or you have access to different ways to put this

together, to create what your need is for your situation.

And allow the system to be that flexible, and to have that kind of control that allows a consumer, whatever kind of consumer, to have a choice of what they're after.

Can you get, you know, the desired power quality where you want it? Hey, Pat. And can it enable consumer participation and electricity markets, customer flexibility, in terms of what kind of technologies do they want access to.

And in addition to provide dynamic protection privacy in cyber security. Can you build all those things in? Can you do those things on top of all the other requirements that people want to put on, whether they're RPSes or whether, and can you not break the bank.

Can you actually make it beneficial to consumers and not just continue

to add cost to everything that the system does for them.

And then, as we think about all the things going on in the Department and across the world, really, have we really thought out, internally? And the answer for us is no.

What do we really want in terms of a hybrid grid? In terms of AC-DC? So if I think about the end-use sector. If I think about LED lighting, if I think about electric vehicles, I think about energy storage.

I've got DC systems that are, that want to naturally be that way within those, now, do I want to think about, how do I market that?

How can I get efficiencies in my systems if I think about a different kind of configuration that I have in a household today or a building complex today.

Do I think about different kinds of linkages that I want today at the

transmission level that could add to this and allow us to be more flexible in our designs.

As we think about how hard it is to get transmission in and do we want to move some things from point to point. Are there options for more connectivity on the DC side and those kind of things.

And from our viewpoint we just don't think we've studied this adequately and we need to understand better what those opportunity sets are and what the potential could be in the future.

If I think, if I, I mentioned the QTR, this is a variant of a diagram that's in the overall QTR, looking at stationary across the board, looking at transportation. And the modernize the grid is in there and we've enlarged it.

And the point that we wanted to make here was that to progressively electrify the fleet, deploy clean energy generation and increase building industrial efficiency, you

can't do that without the grid improving at the same time.

They are dependent upon those. I that a question? I'm sorry, quadrennial technology review. I mentioned in the beginning Dr. Koonin led that looked across the DOE's portfolio.

Again, that report is out. It came out in the last four or five weeks. The technology parts will be out soon. But we'll get you that, make sure you have access to all that.

Because it's, in my opinion it's well worth reading and understanding, but this is from that document. So the grid connects and touches many parts of the future energy system.

And that, so, we have to think holistically across Departments. It's not just about building a grid team, that I talked about, but it's how do we connect to the vehicle program. How do we connect to the

buildings program and make sure that we've got the seamlessness that we talked about that.

Lastly, we will just make the point, everybody says it's too complicated. That this is too big. You know, we can't come up with a single, you know, a single goal to handle it. And, from our viewpoint, it really felt, from the team standpoint, that it's just too important to ignore.

We have to find solution sets. Despite all the complexity, we have to find paths forward to improve this. The system, the requirements for the people in the United States, the system itself are going to demand changes.

We ought to be proactive about how to handle that and make sure we're getting what we really want and I can optimize from that. This is a document that we created from those discussions. And within the red box that squiggles around, that's what we thought was the Grid Technical Team Space that we were

talking about.

And it shows generation and end-user use which were not part of the team's purview but it shows the connectivity to those.

Because, again, we feel that it's, from this T&D space or this team's standpoint, that we're going to talk about the seamless connection idea and we're going to talk about that really the grid controlling needs to, if we're going to tie demand response in, in a big way.

If we're going to tie in efficiency programs, we're going to tie integration of different things, especially renewables with variability.

How do we, who controls that? How does that happen? And we think it happens in this space. And so that changes, it's not just thinking about do I build a transformer, do I connect a line from A to B?

It's what kind of connectivity do

I want where. What are the regional variability that we need to understand and what are the solutions sets that people want both locally and regionally to make that happen.

Understanding the system, visualization, communications, computation. Understand the flexibility for stability in that, and the security needs are critical across that space.

Because it's no good to leave the vulnerability in all the buildings that can be an access point to the entire system. You have to think about how can you protect that.

And, of course, integration and renewables, there are activities we have going on within the Department and with our partners in the private sector, and interface with end-users.

One thing I'll talk about toward the end is just Smart Grid Hub concept and the idea that we want to spend some time on the

transmission distribution connection space, because we think maybe that's a place where we can talk about the communication needed.

And the different kind. Can we think ultimately, what can this be? What could a substation of the future kind of concept be that it's not today?

So we took all of these actions from the QTR again, the senior leadership discussions and in our own meetings and we said all of these things in the circle are important, and I'm going to spend a little bit of time on the ones in yellow.

But we sent the recommendations to the Secretary and then part of this fed into the 2013 budget process, which of course is not out yet. But it did, the discussions were with Secretary Arun and Pat about, you know, what do we think and what does that say about the portfolio? That we need to develop critical institutional techno-economic goals.

We need to fully explore and

integrate AC-DC and really aim for some no regret, high value actions, that we could do today.

So, one area that really jumped out is a potential place to do some things. And, again, this is a DOE viewpoint. So what we've done is we've incorporated some of the things in ARPA-E, some of the things that are going on in EE, some of the things that are going in Science, into our planning here.

And we are co-working some of these issues. So, if you look at some of the things that we've done in gallium nitride, some of the things that ARPA-E has done in silicon carbide, and the activities going on in our public and private partnerships, we think it's feasible to think about some longer-term goals in this space.

And if you can really get price effective for, for example a 20kV 200 amp solid state device, that starts to change what you can think about doing in the entire grid

space.

And so the next two things are what kind of things could we think about doing. One of those would be, okay, what if we could get AC-DC converter stations the same price as AC converter stations today.

How impossible, how hard is that? Let's explore that and see. If we could do that, that changes some decision making because that's the high cost component of going into the DC.

And we can think about different kind of configurations than we think about today. And these are just an idea of what would it take, from a cost reduction and the impact reduction to concentrate on those things.

So can we, within the Department, utilize the work on things like thermal management in the science side and bring that to bear on the grid thinking from ways that we've not done before.

Utilize that four and a half billion dollars we're spending every year in the science side of the house to grid application and that's really what we want to do from a technology standpoint.

So can we do that? Are these the right goals? We continue to explore those. There are things that we think have some merit. Some of them have some background behind it.

Some of it I wouldn't want to defend in court, yet, but I hope to get to the point where these discussions lead us to, you know, how can we go forward on these things.

So is it possible to talk about a 3x increase in power levels, allowing on-ramps, off-ramps, that kind of thing. The second one is, can we go to solid state transformers.

Can we create a transformer at that kind of level, we're not saying all levels necessarily but can we say the 138kV,

create one that has other functionalities built into it.

So we now create a problem approaching it from a solid state. We have the kind of devices that we think are pretty imminent and there's some things that we know about that.

Can we start to build on these other features that we've been talking about for awhile. We've done single demonstrations in a couple of cases, but we really haven't pushed into the market, and create a new way to handle this.

And what are those goals that are reasonable to tackle when it comes to that. Can you build in fault current limiting at that kind of level.

Can you really get the two-way power flow that you want. Can you embed the sensors for communications. How scalable is it, you know, to what levels can you really take this.

Advance modeling is something that we've been pushing and science has been pushing. And, again, can we really think about this space differently.

And there's been a couple of meetings that Gil Bindewald and Sandy Landsberg in Science has held, over the last year and ARPA-E has held. To think about can we approach this differently?

What do we really need to move to new models, planning operational tools. As we think about all this data that's going to come out of the ARRA demonstrations, of the phase to deployment that we have.

How are we going to use it? Do we really understand it? Do we have the computational ability to do this? And there's some pretty, pretty neat things happening in the basic computational space that we want to apply to the grid and streamline it into this kind of thinking. Energy storage. Those, the things I mentioned today have not been in our

portfolio in the last couple of years.

They are, if you look at the recent awards being made, we're dabbling in this space, in these spaces as a Department now.

Not what I would call major thrusts. Some single shop ARPA-E kind of, you know, the high risk shots at some of these things. Some of them, we think, are going to have payoffs, but trying to start to build a case that these need to be major thrusts if we really think it's going to have the kind of advantages that we do, build a case for that.

And we are in the process of doing that. Energy storage, we have an existing portfolio. We have a program, that program across the Department spans all the TRLs, the technology readiness levels one through ten from basic science to getting it into the private sector, getting it into the market. There's actually a lot of activity, both from the stationary side and on the transportation

side where, of course, our budget, Imre Gyuk leads the effort on the stationary side.

ARPA-E has a strong presence, has had the last two years in this space. In fact, I believe this, I believe it was last week or this week, the peer review is happening.

A joint peer review through ARPA-E and OE on what's happening in the storage area. There's a lot of VC money moving into this space.

The last couple of years, there's just a lot, we have 16 RE demonstrations that are putting out storage projects. This is a very robust area right now.

And there's some really neat things happening in different kind of batteries, different kind of chemistries. You see from typical lead-acid with carbon additions that are changing the lead-acid space all the way up into the things like air batteries, different kind, you know, liquid

batteries to look at in different ways.

Very exciting. Can we reach these kind of goals? Can we push this in a way that we've not pushed it before? Can we bring some of the basic science, understanding the materials into this.

Enter dielectrics into all of this, going back to that last one. That's the questions that we're asking ourselves. Cyber-security. The point of this slide is it's complicated.

And it's getting more complicated and the system is, and Hank Kenchington who walked in, and can talk for a long time about this.

We want to try to stay into the area where it's secure and reduce vulnerabilities and tremendous concerns and we have a strong effort in this area. But, again, can we bring in more of a total departmental effort into this and it's happening. So I talked about the technology

and some of the thoughts on the technology side.

And, as many of you know, Lauren Azar has joined the Secretary's staff to help look at some of the institutional areas with us. And David is working and Larry Mansueti working with her daily on those kind of things, and Pat.

As you know, it's complicated space. All right, we accepted that before. And so it means that you have to really come at it in a lot of different ways at the same time and you have to think about how can you bring innovation to avoid risk aversion and really to really get buy-in and to really protect the consumer in the process.

So, in the short term, this is kind of some of the things that we're currently working on. We have the interconnection planning process going on. And the three interconnections, it's a good start. It's, you know, Bill, we don't

normally get 80 million dollars to throw into an area and really tackle it.

It will not, in my opinion, will not be sufficient to carry everything. We've got to all carry through on it, at all levels, federal, regional, state to truly make this happen.

And to get the benefit of all the effort that's going into the planning today. How do we do that? What analysis do we need to really show people some of the decision makers in that process. What can we do?

And how can we expand what we're doing. And then it gets into better analysis of tools, understanding needs, again back on the AC-DC issue, T&D, investment and decision making, education outreach.

How do we make sure that people have the same basic vocabularies to move forward and move on to the next five years. What are we going to do from the analytical basis side, to help with the state, regional

and federal coordination and decision making.

I talked, we have Smart Grid Demos in the ARRA funds, but we also had, I talked about it a little bit, this smart grid hub concept.

And the idea that, can we think about, from the hub concept, a functional substation with components, connected to an operational control room, has R&D facilities.

But we can use as a learning tool. So, kind of the thought is could we create two or three regional, regionally placed substations that would allow us to really bring in, not just the technologies to that space, but the policy side and people think about what are the other socio-economic issues surrounding that.

And really have a robust, and a model for this, there are a couple of new hubs in the last three years. The closest one if the buildings hub in Philadelphia. You're familiar with that, but a third of the money

actually went into non-building related traditional technologies.

People studying impacts on trends as people move to cities. Trends in transportation, how it will affect buildings. People's decision making kind of things. So it's a very robust and a way of opening up and making sure that we're not just looking at this myopically and that kind of consideration.

And we are -- so we hope to develop over the next year, an idea of how could we do this and is this really an area where we can kind of bring it all together and really be a test for all of that stuff.

So next steps, we're going to have in November, we're going to have a vetting meeting and invite 100, 120 people to talk about this and to expand on it and try to bring in, not just DOE viewpoint on this whole thing.

And we would welcome your comment,

we would welcome your participation in part of this. And in February we're planning also to have one of the Daves talk about this kind of thing at the joint NARUC meeting.

And ultimately lead to developing this road map for DOE activities. And I will stop there and take any questions. I'll answer all your questions.

CHAIRMAN COWART: I just wanted to say, are there clarifying questions just about what Bill has said, because we're going to have some responses and then discussion.

MR. PARKS: So anything --

CHAIRMAN COWART: I do have one factual question, I suppose, on what you presented. I didn't understand something about the second slide, the blue arrows, that one.

Because on the prior slide the DOE's clean energy goals are stated, 80 percent clean energy by 2035, let's say. And then, in the changing supply mix arrow, the

2035 mix doesn't look like that.

MR. PARKS: Well, there are two different things and, again, we're -- this is part of -- the point is to contrast. This is what DOE said in the strategic plan.

This is a composite of a number of different sources. And the point is that there is not consistency across that. There's a lot of different viewpoints about what that solution set is, and that's the world that we have to operate in, where we have those uncertainties.

So they're not meant to be consistent. Yes, sir.

MR. KELLIHER: If that's a composite, I'm not aware of any projection that envisions natural gas, electric generation dropping by 50 percent, you know, in terms of share.

MR. PARKS: Dropping by what percent?

MR. KELLIHER: Well, you have a

range of ten to 20 percent. Okay, if you look at 2009, 2035, look at natural gas share of electric generation.

MR. PARKS: Yes.

MR. KELLIHER: The high in 2035, is the current share. And I'm not sure many people would agree with that, at least on the high side.

MR. PARKS: I would agree, that's probably going to be the most controversial point of today.

MR. KELLIHER: Well, I think a nuclear share is pretty big, too. So, anyway, I realize no one is going to agree exactly on that, but the natural gas one --

MR. PARKS: But I look forward to the discussion on the natural gas.

MR. KELLIHER: Okay.

MR. PARKS: Anything else from a clarifying standpoint? Yes, sir.

MR. VAN WELIE: Yes, I was curious about the Smart Grid hub. When I looked at

the presentation I wasn't sure how to interpret this phrase, because it was a new concept to me.

So I wondered whether I should just think of it as a smart substation or should I think about it in the communications sense as a, you know, the way you think about a hub on a network, or was it supposed to be both?

MR. PARKS: Well, it's supposed to be both and a little bit ambiguous, only in the sense of we're looking for feedback on what should this be.

Is it sufficient to be a smart substation or do we want to broaden it and how should that be.

MR. VAN WELIE: I'll save the rest for when I respond.

MR. PARKS: And, again, recognize that it's building on what we know about Smart Grid demonstrations that are out there today. Okay. Thank you very much.

CHAIRMAN COWART: All right, thank you, Bill. Before we launch into the responses, we actually have -- we have another visitor from the Department with us.

Hank Kenchington is the Deputy Assistant Secretary in the Office of Electricity for R&D, so this conversation seems to be right up your alley. I wanted to say hello to you.

And, so, let's begin with the responses. And I think, Bob Curry, you're first.

MR. CURRY: Yes, I was trying to stop Joe from stepping on all our lines. Because I'm the, as I noted earlier, the sole State Commissioner standing here or sitting here and I thank you for the opportunity to respond.

I come to this august position on this panel and the New York State as a corporate transactional lawyer. I'm not from the business.

My pretense to having any engineering understanding whatsoever is I represented as sort of Chief Counsel at a shipyard in New Orleans for 25 years that built vessels for whoever wanted to buy them.

Particularly the Navy during the last decade or so. So, as we all know, erecting steel is not a particularly difficult task, so my engineering expertise is accordingly quite limited.

The good news for lawyers in that experience was that every program ended up in some sort of adversarial fight. Either in court, in arbitration or with the Department of the Navy.

And I had the opportunity to contrast dealing with the Department of Navy, headquartered down the road here, at this point, and at one time in Crystal City, where a change order of a couple hundred million dollars -- should it be closer -- a change order of a couple of hundred million dollars

was not considered a real big deal. Certainly it would never hit the papers, it was just another change order.

Contrast that with a quandary I got my shipyard into when it offered to build a floating prison for the city of New York. And as you take of from LaGuardia Airport, if you look over on the Bronx side, those of you who are on the wrong side of the plane, you will see this squat gray and blue thing, and that's a floating 800-bed prison, built to American Bureau Shipping Standards, flagged as a U.S. vessel.

A five million dollar change order on that contract for the Department of Corrections of the city of New York, with a population of people who can't vote legally, if they're in there for felonies, would hit the front page of the Post or maybe the Daily News.

So I bring to this discussion the sensitivities born of that, born of being in

my position now, a professional pinata, where, you know, people whack at us when things go wrong until something breaks.

And also informed by the thoughts of a guy named John Hofmeister, who some of you may know, as formerly Chairman of Shell US and President of the American Urban League, and John created something called Citizens for Affordable Energy.

It's a grassroots attempt to control energy costs, et cetera, and he likes to point out that there are in the neighborhood of 20 federal agencies that oversee power and energy, not electric power. And almost an analogous number of committees and subcommittees on the Hill. So change in this area is tough. I want to say, in a strong complimentary way, first and foremost, this presentation is a very good attempt to sympathize inherently irreconcilable views.

And since I am not that good at engineering and I'm going to make some

comments about the technical side of this that come from the staff, but, if they're wrong, it's my fault because I can't construe them correctly. So, let's start with that. New York is ideologically in sync with the clean energy goals. We're seeking clean energy sources for the production of electricity and the reduction of greenhouse gas emissions.

We're one of the founding members of RGGI and a main driver in its establishment and the pursuit of CO2 emissions. As a matter of fact, RGGI is right across the hall from my officer in New York City. New York has been pursuing a policy called 45 by 15, which is one of those complicated, back of the envelope, press conference numbers that means a 15 percent reduction in energy usage and getting 30 percent of New York's electric needs from renewable energy by 2015.

While the economic situation has slowed our progress, New York is spending almost a billion dollars a year on energy

efficiency and renewable incentives and is very committed to reaching these goals. Unlike some other states who are reconsidering them at this point. The emphasis in the paper on the development of utility scale energy storage and decreasing the size and cost with DC converter stations is where the focus really needs to be.

A parochial observation from New York City, there are very few available transmission rights of way into New York City area right now. Usually people say, well, we can always go to the thruway or the -- there's no room left in those places in New York.

So reliable compact energy storage that can be sited throughout the city, would allow folks in the city to take advantage of wind and hydro at night, shipped in during a lighter load and be taken out during peak load hours. That's something we're very keen on. On-site energy storage would allow optimum use of the existing transmission system and avoid

new construction in an area where just getting into New York is a four to five million dollar a mile proposition. It's relatively expensive.

Obviously the converter, the cost of convertor stations and their large footprint, limitations of the current application of DC converter technology, so any focus in investing further in pilot projects in DC converters are very worthy pursuits.

The version of the grid appears to be a little bit optimistic in some respects and should be re-evaluated based on cost, time and public perception constraints.

Again, being not from the business, I look at almost everything that comes before us at the New York Commission from a dollars standpoint. I look for endeavors in energy efficiency and renewables for valuation measurement and verification. I look for people to always give us ratepayer impact on whatever is being proposed and I'm

encouraging the New York ISO, which so far is a little bit tone-deaf on this, to do what the Southwestern Power Pool does, which is to try to attach some sort of ratepayer impact to, even if it's very rough, to some of their determinations.

So, on Page 2, the vision calls for deployment of 26 million smart meters in homes and businesses by 2013.

And I think, Bill, this goes back to the question that Gordon asked. What so you really intend by smart grid? I think I can get much closer to your slide in the back than your slide in the front, as far as that's concerned.

Because the goal is really costly and it's a significant burden on ratepayers. It's highly unlikely, as we've considered this in New York, that New York will be any part of that 26 million in terms of homes. We're all for the deployment of whatever people want smart grid to mean, short of the distribution

system. When you get to this distribution system it's just my view, too bloody expensive to carry it forward. And much to their chagrin, I imposed on Con Ed to get some fairly sophisticated focus groups to look at various issues. Including issues like how much do people want to manage in New York City now, and people who live in apartments. How much do they really want to manage or be bothered with, and the answer is not at all. Just, you know, I'll pay it, I trust the bill, which was a great relief to Con Ed. I trust the bill and let's just keep moving.

There was no ratepayer interest other than one guy who was retired, which I will be very soon, with this attitude, who had nothing else to do except manage his energy. So, he was really an astounding individual from Jamaica and his lilting voice made you almost want to manage your energy, when you listen to him.

The vision of doubling of nuclear

energy sources by 2035, I think is absolutely the direction we have to go in. Again, being new to the field, I tried to do some historical research and understood the dependency on any one fuel. I grew up in New York where hearing the words, nuclear is too cheap to meter.

I mean, you guys have all been through this. I just am somewhat of a visitor to this terrain and know that natural gas is going to have its problems, but in my 40 year career as a practicing lawyer, I've never seen a more transformational event than the advent of inexpensive shale gas proximate to very eager markets.

So I don't share the view, Bill, you articulated, that this is something we have to look at on a 20-year, you know, or maybe the 100 year flood plain, where things -- his is something in my mind that's transformational. Today Bloomberg had an article about the Balken shale reverses, which

nobody ever heard of. I've been updated on Utica, which is below the Marcellus. There are a lot of very happy people waiting for New York to open up, but Sonny has opened up Pennsylvania so, you know, we'll get there at some point.

But let's look at the doubling of nuclear energy sources by 2035. Most useful lives of energy, of nuclear plants, it's roughly 60 years. Even with upgrades and everything else.

So doubling our nuclear capacity will required reconstruction of the existing stations and then some, like doubling them. That's a pretty significant financial undertaking. You all in this Department are keenly aware of the cost of building replacement plants in states where generation and distribution have been separated.

I tend to recall negotiations fell apart with Constellation and EDF over terms. Constellation, in my view, is just an

investment banker that stumbled into the utility business. But that's just my own personal point of view.

So you can always count on there being difficult negotiations. But that's an enormous ratepayer burden. I happened to think it's worth it, but it's a place where you sort of have to make some choices as to what your back-up fuel is going to be.

The natural gas availability is bountiful, I guess is the right word to use, almost biblical in our neck of the woods in New York. The trend over the last ten years in our state, is that for every new generator built, beyond those that have been incented by renewable subsidies, every one has been fueled by natural gas.

It's much more likely that natural generation will continue to expand, much more likely even than nuclear capacity because we're going to have to go through some significant political, perception and

financial trials before we can get ourselves around to that.

The other obvious aspect of shale gas -- the byproducts that could be any part of the wet gas exercise is going to have other significant benefits.

So, looking on to the division of the grid, I think it should be tempered by the realities facing electric industry. Our job, as state commissioners, is safe and reliable service at just and reasonable prices. So we are not the people who ordinarily try to look 40 years down the road. We try to look, and I think you all may be very keenly aware of the fact the average term for a state commissioner is 3.4 years.

They have a lot of turnover in this job. They have good staffs, solid people, clear thinking. They want the same positive things that this group wants, and that, Bill, that you articulated.

But we really need to look at the

aging infrastructure, RTOs. Say, it will cost about 25 billion over the next 20 years to just rebuild what we've got. The distribution systems are changing, now that New York City is trying to cut down on air pollution, all the residential apartment buildings that currently burn Number 4, Number 6 fuel oil, have been mandated to change over to either Number 2 or to natural gas.

Well, that takes up 60 percent of the existing Con Ed distribution network. Just that one event. So how are we going to finance that? I asked Con Ed question and I shouldn't, because they're going to want more money from us, but we've got to do it reasonably fast. This is an expensive, long-term build out. This is just, you know, sort of keep current and deal with the legal concerns as we have right now, not to go forward.

And we had to debate in our last session, last Thursday, whether or not we

would continue that billion dollar subsidy for energy-efficiency, the renewable portfolio standard and new thinking in the energy sector. And we decided we had to do that because no one else was doing it.

And that leads me to another awkward aspect of my presentation. And that is that because of the stalemate within, I guess, a radius of ten miles from here, right now state public service commissions are making a lot of the decisions vis-a-vis energy policy in the United States. And, yes, we are balkanized, there are 50 of us and you add D.C. in, which we must, 51. It's just there is division at every level.

The hardest part of a government agency is to try to harness that to get the best of it to understand that there is a lot of parochialism that is just a natural byproduct of it being a political system and to get beyond it.

I'm sorry, I may be running a

little beyond my time, but the vision calls for new economically driven transmission lines to relieve congestion and to deliver renewable energy. So, here's a factoid. Absent focusing on congestion, New York City, which seems to be every transmission developers holy grail, because of how much money we pay for electricity in New York City. New York City has right now 137 percent of capacity covered by in-city generation, 1-3-7 percent.

So, you go back to the no regrets scenario that, again, fully agreed with that. We have to consider, as a state, if the decision is made to replace Indian Point, what are we going to replace it with?

Well, there are a lot of generators who say, let us build you a new generator. Gordon was telling me about a company up in his neck of the woods that spent a billion dollars to be ready to burn natural gas. And then, all of a sudden, we find that in really constrained situations, I mean

politically constrained situations, some of the congestion can be eliminated for not all that much money.

There can be some north/south transmission refined, enhanced, bettered, for all not that much money. Do we really need 2,000 megawatts from Indian Point or is it more likely we'll need 1,100? Maybe, Bill, some of the experiment that you're focusing on, we're going to have to go through fairly soon, because we are the backstop at the Public Service Commission to worry about this stuff because both politically and practically, we're the ones who can basically encourage people to do it, and then make the ratepayers for it.

So, another observation, this is more from staff than from me. Development of energy storage devices is really the first and most positive thing that will work in our state. All congestion is not bad. Because of the costs of new transmission construction

along the east coast and to the east coast, what looks like high levels of congestion in some places is actually economic when compared to the cost of system upgrades.

The new transmission must be justified and sited wisely because right away in our neck of the woods is a scarce commodity that uses up all sorts of environmental tolerance as well as environmental resources.

Going back to the themes in New York that I touched on. The availability of Marcellus gas and Indian Point. Cynics who write for the New York Post, and maybe for the Washington Post, too, but definitely for the New York Post, point out that one thing is appreciated by the environmental movement and the other is scorned by the environmental movement.

But, nevertheless, somehow, in state government those to things are moving in tandem. So, as I say, cynics may observe that there's a tradeoff going on and Dr. Faust is

cutting a bargain out here someplace and we're going to see Indian Point and Marcellus sort of move in lockstep.

But I should hasten to say that I'm not even speaking for myself on this, I'm speaking for the New York Post. The recommendation in the vision is to pursue the no regrets, high value facilities, that's really where we'd like to see things come out.

Now a couple of detail things that those of you who -- just tolerate me on this because I'm going to read it straight.

On advance modeling on Page 13, on N11 contingency analysis, our staff thinks is already mandatory in the bulk electric system under NERC. Also, they view the current electrical models do reflect reality. The planning models for reliability purposes are genuinely within about three percent accuracy, but the area where modeling is imprecise and inaccurate is in economic planning, thanks again to the economists, of course.

And that's mainly due to the complexity and difficulty in forecasting the market parameters. But the hardest thing for our staff to take, and I've got a lot of experience in this town because of having to deal with the Navy for so many years. And I didn't take it askance, but the relationship with the local regulators has to be a dialogue. And, to a certain extent, some of the slides tend to look like, well, we're going, we're from the federal government and we're here to help you.

I know that that is not your style, I know that's not where you're coming from. But reading it cold, which of course my colleagues did, after seeing that the -- they need to be sort of reached out to. Which is not an easy thing to do from here, I understand that. But when you get to your institutional complexities slide, it looks like there are all these folks running around, they don't really know what they're up to, and

we need a federal backstop siting authority if for no other reason than to scare people into doing the right thing.

Now those of you who have had experience in environmental mediation understand very well what the phrase is, "and if you don't get this cleaned up, this will become a Superfund site."

What that means is the federal government is going to come in, through the EPA, and they're going to spend whatever of your money they want to spend, to help you clean up that site.

Nothing is more useful in New York state than suggest that a manufactured gas site might be a Superfund site, and all of a sudden things start moving like crazy. So, that may be your intent, was to provide a weapon to encourage people to do the right thing, faster rather than slower, that's the benign view of it.

But our staff was concerned that

you might now have that view, so they wanted to point out -- and, again, Sonny, I might be stepping on your lines -- that in the PJM TrAIL line that took basically three years from adoption by the PJM Planning folks to in service implementation for a 345kV line, through three states.

Now -- 500kV. So, that's what our staff notes. So, final couple of points. You do mention on Pages 7 and 8, the need for codes and standards. I'd like to say that in New York, we've made lots of mistakes and the rest of the country has learned from them. And now California is starting to overtake us, but the one thing that California did do right, is that it got the codes and standards stuff down pretty well. So, to the extent that you can think of ways to encourage and cajole and possibly force this aspect on a model standard, I don't know enough about the detail of this, but how you get to a model implementation, that will really, I think,

move things along.

And keep in mind that states, and particularly staff, don't want to be seen as a barrier to change and innovation and is -- might be less in need of education, than you know if you get a chance to interact with them.

And vis-a-vis New York, at least, I'd be happy to provide the appropriate introductions, get you to the right people who are eager to contribute in a positive and effective way, just like all of us here are set to do that.

I guess the final point I would make, which goes back to the difficulty of actually getting stuff done, is -- and also you now have Lauren Azar here to help you get the understanding, sort of from a Commissioner's perspective.

But I was a General Counsel for about 15 years, and afterwards joined a law firm that was given the task of working on the Iroquois

Pipeline, which was the first major Canadian gas to New England/New York operation. It was sponsored, at that point, by TransCanada and Brooklyn Union Gas Company.

Now, I joined the law firm that was pushing this along and they had a big map in the war room as to where this line was going to go. And I said, you know, you guys really think you can pull this off? These were areas of New York where I knew various, intensely wealthy people from New York had their second or third or fourth home, whatever it was at the time. It wasn't quite as bad as it is now, so maybe it was only their second home.

And we had -- Federal Power Act did this under national authority, no problem, we're going to go right through there. I said, well, do you see this space here? I think Dr. Joyce Brothers, who those of you may remember from the real old days, I think she has a place there. And there's nothing

she'd like more to do than to show her neighbors that she actually has some clout and she's going to protect them from the intrusion of this nasty line.

Now, of course, I was new to the law firm game and the lawyers thought this was great. We're going to litigate this for years. But, from a practical standpoint, it did take three or four extra years to get this done. Because notwithstanding the draconian, we can do this, we've got the right on a national emergency, whatever the right phraseology is, apologies to Joe, who probably knows exactly what the right phraseology is.

It don't work that way. And we are in a difficult time where even with all of us pulling on the oars in the same direction, we may not get to where we need to go. But we're trying to get that framed right. I think essentially this is a really good approach. Where you are, there lots of tweaks that I can get into in more detail, but thank

you for the effort and thank you for letting me go first so that my ignorance is not too well displayed. Thank you.

MR. PARKS: If I would just pick out a few of those to respond to. One, I though those were very constructive comments, I appreciate greatly. I thought they were well thought out.

From my viewpoint let me reassure your staff that it wasn't intended to say federal government is coming in, they're going to solve all your problems.

MR. CURRY: No, no, I understand that. I understand.

MR. PARKS: It's important for me because I philosophically believe it's partnerships at all levels that make these things really happen, at the end of the day. And I've had the pleasure, for a couple of decades, of working with PFCs and am pleased to do so. Thank you again for that.

And I do want to touch on this

slide for a minute, because I think, Joe, your point was really, really good. We did not band necessarily natural gas well enough. We will look at that, in particular, that one. Again, this was a composite of a lot of things. I don't want -- we are not advocating single solution set in these slides. I want to make sure that people understood that completely.

MR. CURRY: Let me return to that and just say that I disagree with your premise. I disagree with the premise that it should be sort of an average or something like that.

MR. PARKS: I was going to go there. That it's, how then, let me turn it around. How could we get into looking at either a couple of scenarios or the kind --

MR. CURRY: Yes.

MR. PARKS: -- things that would -- that you would find that people would agree enough on to make use of it. Because that's

the issue in looking at scenarios.

MR. CURRY: I think that may come out with wiser heads than mine in a later discussion. But one of the difficulties for people who read volumes and volumes of material is that they hit something like this, right up front. It provides a level of static that discourages you from pursuing some of the more effective, efficient and detailed points you make later. Because it's so contrary both to rational approach and what has evolved into a visceral reaction, that it just gets you the wrong way.

And I think you have to look at significant growth in gas and a hopeful scenario of significant growth in nuclear.

MR. PARKS: Okay, thank you. Roger, you had --

MR. DUNCAN: Well, my suggestion is -- I don't have a methodology, but to go to his point, recent reports from the IEA on the golden age of gas and of shale and some of the

big names that people normally look to future projections, pretty much seem in consensus as far as the rise of gas and no one I think is anymore projecting 40 percent nuclear, in that amount of time either.

And so I don't know what the consensus is of the 40, but to the lay public that's in the field, these are the big headlines that seem pretty much in agreement.

MR. PARKS: We could take a different approach to this entirely. Let me just -- and this maybe comes a little bit from myself. We intentionally took some 2001 data and built on some of that, because we did not want to overemphasize the immediate.

And my point in this is having done this for 30 some years in this space, EIA or IEA and us have all been wrong in their predictions. I guarantee that is a consistent thing.

And, so my only caution and, again, open to change, is not to get too

caught up in the absolute immediate. Because, again, the trend three years ago was a different discussion than it is today. And I want to make sure that we don't get too caught up. And, again, having gone through the natural gas public, I understand that we're at a magnitude that we're talking, but there was a lot of stranded assets associated with the over-building out in the '90s or gas turbines and gas equipment relative to a balanced, more balanced approach of the long-term civilian planning.

And so I would just ask that we -- how do we, you know, look for ways to put all that together from a perspective, and not just get caught in a short-term immediate view of this is what we're seeing today.

CHAIRMAN COWART: All right, I already -- I see that we're about to launch a really great dialogue, which is exactly what we want to have happen this afternoon.

I also see, looking at the clock,

that we are set for a break of just a few minutes now. And I can announce that there are refreshments for EAC members in the adjoining room.

And just -- we had a 15 minute break scheduled, I bet you it will be 15 minutes, so let's come back at 20 before the hour and we'll hear from different respondents and we'll continue this conversation, thank you.

(Whereupon, the above-entitled matter went off the record at 3:23 p.m., and resumed at 3:43 p.m.)

CHAIRMAN COWART: We've had the good fortune to have a series of planned, thoughtful responses to Bill Parks' presentation. And we need to hear from Mike Heyeck, Sonny Popowsky and Gordon van Welie, so what I'd like to do is move us through, if you can remember your comments, let's bring them up later.

And what I'd like to do is move on

and hear from the other Respondents. So, Mike, I think you're up next.

MR. HEYECK: Thank you. I also want to congratulate Bill Parks on putting together, I would say it's a great starting point, but that's, it's actually more than that.

And giving me the opportunity to say something about it. I've been in transmission for about 35 years. I had a stint in finance as well.

I love transmission, I happen to be the few that like to look at transmission towers. Not necessarily distribution lines, but transmission towers are pretty, actually.

MR. CURRY: We had one in the Mohawk River during the last storm, so you would have enjoyed that a lot.

MR. HEYECK: I'd like to start with a couple of comments about the industry construct. First of all, we are, we are so risk-averse that we will boldly go where

everyone has gone before.

And that's a statement used by many in the industry. We spend so little in R&D. We have so many regulators. We have so many decision makers, so many people watching over us.

We have about 3,000 players, if you include co-ops and municipals. It's a construct that can hardly develop the next pharmaceutical dream that would avoid someone's operation.

So it's a construct that has created the likes of EPRI, and actually has created the likes of the Department of Energy. Because the energy industry is so fractured into many different sectors and because the electric industry is as well, that began that construct.

And I don't want to lose sight of that. I would really like to have, one of the major comments I have is to make sure that the Department of Energy's plan and the EPRI plan

are linked together.

The other thing I wanted to get to is you have, being here 35 years and Dave Nevius and I know Thomas Edison personally. I had a physics professor that said never believe a J-curve. And a J-curve is extrapolations. We in the industry, we in the world, simply extrapolate today and believe that today will be a little bit different than tomorrow, but not much.

When I was growing up we thought about flying cars. And if you know, if you're as old as me and know that, you know the flying cars had fins. So they extrapolated a future based on what they knew today.

And I have a feeling that's what we're going here. We're extrapolating a future. And so we need to know what the discontinuities are going to be out there.

One discontinuity I think that's going to be big, is we are largely a centralized way of doing things. We generate

electricity, we transmit it and we distribute it.

There is going to be a move to decentralization. Where that is in the spectrum, we do not know. But think about this, will the 21st century customer accept 120 minutes of outages, momentaries?

Will they accept that? Or will they devise systems, because of the last outage to back up the electric company. And when does backing up the electric company become their primary source of electricity.

And those are, that's the dis-continuity I think, and you can talk about micro-grids, as well. Community energy storage, a storage battery in the backyard that looks like what I have today as a heat pump, in the size of it. Solar-powered and so on. So if you take a look at that spectrum, I happen to believe in the next 20 or 30 years, we're not going to be fully decentralized.

There's going to be some happy medium in the middle. So what will the 21st century customer want? And I really think that's the way we have to look at these slides.

What will they desire? And it isn't, you don't have to go too far in looking at these devices. And, in fact, this is an old device. With iPads and iPhones and i-anythings out there.

To me the three pillars of the grid itself are the grid -- the physical assets -- real-time control and someone tending to the assets.

That's how I look at the assets. But, again, if I tell you, that's transmission. Think about what the 21st century customer wants. What are going to be the drivers of the change in the industry, I'll just say from an organic approach starting out and then the discontinuity.

We are going to replace aging

infrastructure. We have about, if I guesstimated, about a third of the assets in the United States or at or near life, and are going to be changed out.

Are we going to replace it in kind, or are we going to replace it with something that's more efficient, more secure, better use of right-of-way and so on.

I'll give you an idea of just efficiency. For transmission and distribution, we waste every year 350 billion kilowatt-hours in delivery, 350 billion kilowatt-hours of delivery.

And, some of that actually is wasted, we have so much, we have high-tech devices cooled by low-tech equipment, lighted by low-tech equipment.

And I think Con Ed and TVA, I believe, have gone through an experimental, through an EPRI Transmission Efficiency Project, to look at how much we can save by just changing out the equipment we already

have.

So efficiency is very important as we change out. And where the DOE can be very instrumental, particularly in security, we'll talk about that tomorrow, is providing some standards out there by which folks can become efficient.

Manufacturers are not going to help us get there. We've been beating on them and they're used to providing us the lowest cost equipment possible. Well the lowest cost equipment possible, if you include the energy loss over 40 years, is actually higher cost.

The second point in drivers is fuel rationalization. We all can think about gas, are we going to go modular, nuclear? What's wind going to do? What's solar going to do? But I also want you to think about the third point in the drivers and it's a 21st century customer.

What are they going to do when they don't want the outages anymore. What are

they going to do? Some of the boundary conditions, I mentioned one already.

That there is a body of knowledge out there called EPRI that can be leveraged. EPRI has done a good job. In fact, the process by which they came up with Prism is really, I think, the process by which might be instrumental to the DOE to come up with the future of the grid, or the vision of the future of the grid. We also need to recognize there's a boundary between the utility and competition. And that boundary is not going to be where we think it is.

And I, you know, we think about the meter. But where is the boundary going to be between the utility and competition. And if the boundary moves, you incent a different type of R&D profile that will yield probably something better than we have today.

The other boundary is between the Department of Energy and the manufacturer. I do believe the manufacturers have to be

pushed, but they're also market animals and they will develop the better technology.

We will -- some examples. I mentioned to somebody today that we're replacing our 765 kV equipment, and we pushed the manufacturers to quote more efficient equipment, using electricity prices that are double what they are today to justify those costs. The voltage source converters or the HVDC stations today are very lossy.

Not the conventional ones. The conventional only lose about one-half a percent. The newer ones are about one to one and half percent each station. That's a lot of losses.

The average life of those stations are not the 40 year transformer. They are something in the order of 20 years. There's got to be a paradigm shift in the way we look at these devices.

We have to push the manufacturer to become more efficient, to make these more

modular so they can separate out the 40 year old life equipment, from the life of, from the equipment that's plug and play.

So recognize that there is a boundary there, but I do believe the manufacturer is also on an extrapolation that could be pushed real hard.

Now, nothing against HVDC, I really do believe that the line itself is much, the lines are much more efficient.

Another game changer in the HVDC space is the DC breaker. Once a DC circuit breaker is developed, we will not be stuck with the paradigm of going to AC and back to DC again.

ABB, there's a paper out there, ABB is developing a solid state approach to it, rather than the standard interrupts of current.

I do believe that that's going to be a game-changer. And when we change out the aging assets and we include better use of

right-of-way, HVDC will probably be a bigger player.

I do believe technically we can solve just about anything. I mean we can talk about how tough it is to integrate renewables, well, it's really not that tough, if you really focus on it technically.

I do believe we need larger control areas. The days of small control areas and small balancing authorities are not going to work and I believe we saw it in the southwest United States.

There were four balancing authorities in the area that had the outage, and each could not see the other. I think we're going to have to have larger balancing authorities to be able to deal with the market issues in a law of large numbers approach. And then deal with what folks call intermittency, which I think technology is going to solve that problem.

Wide area monitoring and control.

I love the fact that we're putting synchrophasors out there like ice cream. It's fantastic, we can do that, we were talking about it since before the PTC, so I'm glad we're doing it.

But the infrastructure behind the PMUs needs to be upgraded. Data collection, data visualization needs to be advanced in order to have better wide area monitoring and control.

And, oh, by the way, once the synchrophasor becomes more than a device that gives you forensics, cyber-security gets wrapped around it.

And I believe cyber-security will be stymieing technology development if we don't crack that nut.

Market design. I really think we can solve market design issues, okay. The problem is implementing it. And with decision makers comprising 50 states and the feds and anyone else who wants to intervene, including

all the stakeholders, it's going to be hard to implement.

I just believe technically we can do all that we say that we can do. The last and this maybe repetitive, is look for the discontinuities which are the game-changers.

And I mentioned the 21st century customer about four times. I think distributed generation and micro-grids are going to be game-changers.

I mentioned the DC breaker. Superconducting material and not in a way in which there's a 300-mile superconducting pipe of something.

But if you use superconducting materials in wind turbines or other devices, you can get much more efficiency and maybe we can get the 15 megawatt wind turbine developed as a result.

There's a lot of opportunities in these game-changers that you can't see yet. We didn't see the iPad ten years ago. So, I'm

going to stop there. Thank you.

CHAIRMAN COWART: Thank you very much. Maybe we should just go ahead and hear from the other Respondents and then discuss it. Sonny.

MR. POPOWSKY: Thanks, Rich and thanks to the Committee for giving me an opportunity to give the, try to give a consumers perspective on the DOE vision of the future electricity grid.

Before getting into the substance, though, I want to also thank DOE for recognizing the importance of considering the consumer perspective in a whole gamut of issues that have come up in the last couple of years.

I think I'm the first consumer advocate to serve on this committee. But much more important, I'd say that the current leadership at DOE has consistently reached out to consumer representatives for views on issues ranging from smart grid to

interconnection wide planning, transmission siting and a host of issues.

So I do want to take this opportunity to publicly thank folks like Pat Hoffman and David Meyer, Larry Mansueti, for making sure that the views of electricity or energy consumers are heard.

So with that premise, I'm sorry, with that preface, I want to start out by repeating a comment that was actually made by Commissioner Curry's colleague, Gary Brown, who is the New York Public Service Commissioner Chairman, at a meeting last month in New York.

He was quoted as pointing out that approximately one million electricity consumers in New York, in New York state, are currently more than 60 days in arrears on their electric bills.

That means they haven't paid their bill this month, haven't paid their bill last month. They're behind, they're 60 days, over

a million in New York alone.

And therefore in danger of losing this essential, life-sustaining service. At the same time, at least I believe, that the overwhelming, scientific evidence tells us that we, as a nation, need to change the way in which we produce electricity, in order to avoid major environmental harms.

And some of those changes will be costly. They may increase the cost of electricity significantly and therefore make it even more difficult for even more millions of customers to pay their monthly bills.

So from my perspective, the great challenge for this industry, and the great challenge for our nation is to figure out how to ensure universal availability of reliable and affordable electricity service in an environmentally sustainable manner.

Now I think that challenge, the way I phrase it, is different, maybe slightly different in language, but I don't think it's

different in intent, from the position that was set forth by Bill, and is set forth in the DOE vision.

And if I could quote that, it's to enable a seamless, cost-effective electricity system from generation to end use capable of meeting the clean energy demands and capacity requirements of this century.

And I think Bill, this afternoon, added the phrase without breaking the bank. And I would echo that, as well. So, now in terms of the vision that was set out, I think when we talk about the grid, at least I traditionally think of it as everything between the generator and the end user.

It's the, at least that's my traditional interpretation of the grid, that it's the wires and the facilities that lie between the generation at one end and the end user at the other.

And looking at this vision in that regard, I really have no problem with it,

certainly with the technical recommendations for the transmission and distribution system that make up the bulk of this report.

And I agree with Mike that we have aging infrastructure and it needs to be replaced. And we really ought to be replacing it with the most cost-effective, advanced methodologies to get the cleanest, lowest cost power from the generators to the end users.

And we have to have the appropriate technology in place to allow consumers to receive the greatest possible benefit from the grid.

I also think that the document that was presented today, gets it about right. If you look at the actual language when it talks about, when it talks about consumers. And I'm thinking in particular of residential consumers.

And it talks about consumer participation in the smart grid initiatives. I'll give a couple of quotes. In Slide 4, the

report talks about, quote, allowing consumer participation as desired.

In Slide 5, it talks about enabling customer participation into electricity markets and demand response.

And then on Slide 16, it talks about the goal of allowing 100 percent customer participation and choice. Now I have to think, or I think that the choice of those words allow, enable, as desired, was intentional on DOE's part. In my mind, those words are in stark contrast to words like require or mandate or even assume.

That is, the DOE vision, as I read it, does not assume that all or even most customers, again residential customers in particular, will choose to become active participants in retail electricity markets or time of use rates or peak pricing programs.

And the vision does not require such participation. Rather, and correctly I believe, DOE I think is seeking to make such

programs available to the extent that customers desire or wish to participate.

I had a conversation with Tom Sloan on this issue, and I think it was at our first meeting of this group. And he said to me, that he didn't think that his 85-year-old mother was particularly interested in learning how to use time of use electricity pricing.

My response to him was, you know, neither are my 30-year-old kids. So, and to follow up on Commissioner Curry's point, I spend a lot of my time talking to, speaking at AARP meetings and in church basements and consumer affairs.

And I haven't seen a lot of interest in many of the residential pricing services that the smart grid may have to offer.

I realize people haven't been exposed to them, but even where they are exposed to them, I haven't see that great interest.

And I'm sorry the former Commissioners Grueneich and Smitherman aren't here, because I think they may have more to say about what's happened in California and Texas.

But at least my experience has been more like Commissioner Curry's in New York, regarding the level of the desire of consumers to change their lives in any, well to really change their electricity patterns to really take advantage of some of these technologies.

I haven't really perceived any, felt need, I guess is the expression. A felt need of consumers that would be filled by smart meters and some of the dynamic pricing programs. I think unlike some of the things we've seen, I mean many of the things we've seen in the communications, tele-communication industry that make our lives, have made our lives richer and simpler, I don't know that smart meters make our lives richer or simpler.

If anything, they tend to make our lives a little more complicated and I think they are valuable for many consumers.

Many consumers will be able to save money and many won't. Many will not be able to change their electricity usage patterns and benefit.

And that, again, is why I think it's so important that they, I come back to the language used in the DOE report. This is something that should be, we should be enabling. We should be allowing. We should be making these programs and technologies available to consumers, but we shouldn't necessarily rely on consumer participation in these programs in order to justify them.

I think there are many and we're doing it in Pennsylvania. There are many operational and technical benefits to the smart grid, including smart meters.

And to the extent that consumers can participate in dynamic pricing and other

programs, those are additional benefits that I think can be produced by these technological advancements.

But, again, I don't think we should rely on or assume that all consumers will necessarily want to participate. Now in terms of the national goals, at the consumer end of the grid, I personally would prefer to see a greater emphasis on energy efficiency.

That is things like appliance efficiency standards, building code standards and conservation programs for individual customers.

Getting back to the DOE vision of a cost-effective electricity system capable of meeting the clean energy demands and capacity requirements of the century, I'm sure that folks like Rich Cowart, could spend the next day and a half telling us how it is that energy efficiency is probably, or almost certainly, the cheapest first step, cheapest, best step toward achieving that goal.

And I tend to agree with Rich. And that's not a criticism of this report, because this report really is focused on the grid. I know that Pat and her colleagues have done tremendous work on energy efficiency.

And I'm only encouraging the people, the readers of the report, to look at those additional materials from DOE that really focus on energy efficiency, which I really think probably is the best place to get the greatest bang for the buck. With respect to the other end of the grid, the generation sector, you know, I do note that Slide 2 talks about a goal of 80 percent of electricity, American electricity will come from clean energy resources.

Again, this report doesn't, isn't designed, I don't think, to tell us how we're going to get there. And it really doesn't, and I'm sure intentionally it doesn't define clean energy resources.

And it also goes on and it says

we're talking about, we're a goal of 83 percent reduction in greenhouse gas emissions.

Again, this report doesn't tell us how to get there, but certainly we're going to need fundamental changes in the electric generation mix to reach those goals.

I do think, to come back to the point that's been made by a couple of folks, on natural gas, I agree with Commissioner Curry and I really have never seen, I really have never seen anything quite like what we're seeing on the gas front.

And I agree, Bill, that we've seen these bubbles come and go, but again, certainly in terms of our planning for the future I think it, as Joe Kelliher pointed out, we really can't, it's not logical to assume that there would be a decline in natural gas generation, as set forth in that one slide.

I realize that's just a range but certainly I would not see a decline and I

would expect a growth in natural gas generation.

And the reason that's important for purposes of this report, I think, it's for the reasons that have been raised by Commissioner or former Chairman Smitherman, in our transmission subcommittee, which is the inter-relationship between the electric grid and the interstate pipelines.

And to the extent that we are more reliant on natural gas in the near-term future, than that has to be taken into account. Not just in the interstate pipeline, natural gas pipeline industry, but also in the electric industry.

And just one last point. I do have a modest disagreement, I think, with one of the conclusions in the report. If you go back to the, there was, in one of the slides that, again, that Commissioner Curry mentioned about institutional complexity and all the players.

There's a statement in there that says that the multitude of stakeholders and key actors are barriers to change and innovation, due to risk aversion and extensive process of gaining buy-in.

I would argue that at least in some respects, certainly at least for now, the multitude of stakeholders and actors can also be a source of innovation. And that, again, as Commissioner Curry pointed out, not everything will come, obviously not everything is going to come from the national level down.

But a lot of good ideas are going to come from the state level and the regional level up. I mean being, I've sort of grown up in PJM and I'm confident that many of the innovations that came out of PJM have been adopted in other parts of the country.

I'm sure Gordon can give similar examples from New England. So, in any case, I would think, you know, a famous quote from Justice Brandeis, that the states are the

laboratories of democracy.

I think the states and regions in the electricity field can also be the laboratories of innovation. So, with that modest disagreement, I'll close and look forward for the rest of the comments.

MR. PARKS: If I could just comment on that last one very quickly. I actually agree with you and we probably ought to change how we, I agree that that innovation can come.

But how to balance, I need to think about how to balance that concept with the idea of, that there is, there are a lot of different players. And they are not directly aligned.

And so a balance of those concepts, we need help on that, and appreciate it.

MR. POPOWSKY: And we all have to learn to talk to each other, too, and communicate with each other. And that's one

of the things I think, again, DOE is doing through the inter-connection planning, et cetera.

CHAIRMAN COWART: And now Gordon.

MR. VAN WELIE: Thanks, Ralph. Bill, I must compliment you on taking on this ambitious challenge. You were already given a challenge by the Secretary to do, put together this great vision.

And let me say up front, it's always easy to be on the critiquing side of this equation. The creating side is a lot harder. So once you put out a straw and people start shooting holes in it, I've been in that position.

So I understand quite well what that means. It's a very dense presentation. It raised many questions for me, so perhaps, in due course of time, in the off-line, we can sort of spend time, talking about some of the aspects.

But I try to focus my comments in

a couple of areas. I do think that it is useful to create a framework like this because the true value is that it stimulates the discussion, just like it is stimulating the discussion today.

So you have to start somewhere and I think you've done a good job. I think teeing up some of the key issues. I do have some areas where I may, to use Sonny's phrase, modestly disagree with you.

I did stumble across the natural gas statistics in there. I won't repeat everything that's already been said, but I would like to make a final point on the gas issue, which is the operational issues, in terms of in terms of those interdependencies, not just sort of a high level interdependency that I'm concerned about, it's at an operational level I think there's going to be ultimately require investment in observability between the systems.

It was interesting, when I was in

a conference earlier this week with the system operators of Portugal and Spain, both of which are very heavy, if you look at their mix, sort of gas, wind and in those countries there's a much tighter coordination between the operation of the gas pipeline infrastructure and the electric infrastructure.

My perception, at least, is that as we see coal decline, at least conventional coal, that gap is going to be filled by natural gas. And so this interdependency is going to become more and more of an issue.

In some ways New England is the canary in the coal mine. So we've learned the hard way that this is an issue that needs to be solved.

My second point really was triggered by the word holistically, in a couple of places in the slide. And I think it links in some ways to what Mike said with regard to discontinuities and, I think one of the other responders mentioned the

institutional complexity.

So you mention in your slide this institutional complexity that we have. And if you think about our world, we have one dimension being the split of responsibilities between the FERC and the state regulators and then the other dimension being how far the states have actually allowed restructuring to go within their industries.

And these are two very different worlds, in you're a planner. The only space where I think you can attempt to plan holistically is in the vertically integrated structure, where you sort of have one regulator overseeing things.

In the decentralized or restructured parts of the industry where you have the organized, wholesale markets, the ISO/RTO planner is really dealing with the result of the competitive markets.

And the whole premise really is that the ISO defines the services it's looking

for and let the marketplace respond to provide those infrastructure investments that will meet those requirements, as spelled out by the ISO.

So the ISO is responding and sort of reacting and saying, is there anything that's not being attended to from a planning point of view, and then reacting.

It's almost impossible for the ISO planner to plan holistically because, by definition, they'd have to adopt some kind of central planning role.

MR. PARKS: If I may, just, I would agree with that, but from a national standpoint the argument is to think holistically.

So it's not just from any one viewpoint, but how do we look at all those viewpoints. And which makes it a very hard, multi-variable equation to try to solve.

But that's a little different viewpoint, but I hear what you're saying.

MR. VAN WELIE: Well, here I have a suggestion for you. Which is I think rather than saying, I fear that you might be setting yourself up for an unrealistic goal, which is to try and plan holistically.

I think the reality is, given the split in the jurisdictions and the myriad of participants in the marketplace and the fact that we can't anticipate today what's going to come along tomorrow, from a technology point of view, and here I link to Mike Heyeck's comments.

Which is the world may evolve in a direction of micro-grids, thereby invalidating some of the assumptions that we have today about what is sufficient in terms of grid planning.

So, perhaps it's better to say we're not going to try and plan things holistically, but we need to have a way of allowing the industry to evolve in a way that is efficient.

And the point I'd make there is standards can really help that along in a big way. So, as, if you want to allow for sort of organic growth, standards is a very important aspect of that.

And if you look at the telecommunications industry, nobody did any central planning in that industry and just look at the explosive growth.

One of the things they had to have, though, was standards in terms of making sure that things could actually interact and communicate with each other.

So, coming back to this notion of whether you sort of plan things centrally versus you allow things to evolve, would be a comment on the appropriate use of AC/DC hybrid configurations. I like DC, I think it's a wonderful technology, but I wonder whether you should have such a strong focus on this one technology in a vision like this.

Because I think there are going to

be many ways to solve the myriad of reliability problems that come at us and we, whether we like it or not, we have a decentralized planning model.

So I think the DOE obviously can have influence but the way things are working, from a planning point of view, is the job had been given to the regions to go figure out what are the cost-effective solutions to the reliability problems facing that region.

Of course there will be inter-regional issues that will also need to be looked at. By and large, what's going to happen is the grid is going to evolve in accordance with market economics, the actions of state regulators and market participants.

That's I think what's going to drive things. And so, therefore, I think it's going to be really difficult to really control that.

And we just have to accept that reality unless you were to change the

regulatory structure around the grid.

MR. PARKS: Very quickly, I know, he's looking at me nicely, so he hasn't said no yet. I think that, I agree with, I would actually be very interested to open that question up later and have everybody kind of respond to it a little bit.

But I think part of what we want to look at is can we, if we had a great set of tools that we could put in your toolbox and that the regions look at that, that's kind of the way we were looking at this.

We may not be articulating that correctly, but the idea is, we're not saying here is the solution set. We're saying, hey, if we look at the toolbox, if we had this kind of tool or that kind of tool, that we can offer to people, then you've got more choices on what you do, other than local decision making.

MR. VAN WELIE: I agree, think that's an excellent role for the DOE because

you can, if you can take certain technologies to the point where they become cost-effective, with a sort of breakthrough, have a breakthrough in a technology area, you're giving planners another tool to use.

I think the same thing is with standards. So I think Sonny or perhaps Bob Curry mentioned this. The optics, in some parts of your presentation, tend to be a little bit centrally planning oriented.

And I think you're going to find push-back from stakeholders as you go out there with that. The one thing I did want to also compliment you on was the recognition of this need for advanced monitoring capabilities.

I'm convinced we're going to see increasing complexity in terms of grid operations. And we're moving from a world that was literally static, to a world where we're injecting highly variable and limited energy supply all over the system, and it's

going to be matched to highly variable demand, micro-grids, DR and so forth.

So the amount of variability on the system is going to increase, the complexity is going to increase and I think that the current state of the art with respect to modeling and applications isn't going to be able to handle that future.

We're going to have to continue to make investments. I think Mike made a very good point around the use of the PMU data. So we're sort of busying putting out these PMUs all over the place, but we really don't have applications that can use the data coming from those devices.

So I think that is an area where the DOE, I think, with your research capabilities, can really add an enormous amount of value to the industry. And I think once again to be paired in some ways or at least cognizant of what EPRI is trying to do, because they are also trying to tackle some of

these issues.

As you could tell from my comments, it's not clear to me, and you, I guess, admitted that the smart grid have something that is, by design, fuzzy at the moment.

And I wondered whether it was too ambitious to try and put all this complexity into a single concept called the smart grid. I can imagine substations becoming more and more sophisticated over time.

Better communications between the distribution and the transmission levels. Lots of substation automation and smart systems going in there.

The other thing I'm very conscious of, though, is that we're going to see a very fast evolution in terms of the communication interaction between wholesale and retail, which will be complete, will completely bypass the substation.

A DR is one such area, but if,

just think about electric vehicles. I think that communication between wholesale and retail will open up and it will be appliances like the electric vehicle I think that will drive that.

And so I wondered whether you'd be better off developing a framework for inter-connectivity. So I'm showing that here's, we're not going to try and predetermine what the outcome is going to look like, because we don't know.

The one thing that we do want to ensure is that there's inter-connectivity and I think that framework, once again, leads to standards.

And there are a lot of people talking about standards in these areas at the moment. The one thing that I'm not sure of, because I haven't studied it, is whether there's a sufficient degree of convergence occurring, and I think this is, once again, where the DOE can play a very valuable role,

to have a look at what's happening, all these different forums, because the sooner we get convergence on some of these standards, I think the more productive it's going to be for the industry.

My fear is that we get, I don't want to use the word stranded investments, because it has another connotation, but let me say islanded investments.

Where we sort of rush out and deploy all of this technology and then we come back to use it one day, and we suddenly realize it doesn't talk to each other.

So I think there's an area where we're seeing a lot of investment, driven by ARRA investments. I wonder, in the end, whether all of this infrastructure is actually going to be able to communicate, and I think that's an area where DOE can really move things along.

And then the final point that I'd make is that I think your emphasis on cyber-

security is right on. That's going to be a key issue and I think we're going to be faced with having to evolve in that area, as swiftly as the industry evolves.

I don't think there's going to a single-point solution. That's going to be an ongoing investment. Thank you.

CHAIRMAN COWART: Thank you, Gordon and thanks to all the commenters. Bill, you have immediate responses or should be just --

MR. PARKS: I talked for a long time.

CHAIRMAN COWART: All right, I see some, I'm going to ask some questions in a few minutes, but first I'm going to hear from you all and I'll just start on this side and work around. Ed.

MR. KRAPELS: Yes, thank you very much, Bill, I think it's a great presentation and very stimulating.

I wanted to push Gordon's comments

a little bit further. And that is I think DOE does have a very valuable role to play, even more a valuable role to play if you assume that the regional laboratory concept really is our present and our future.

In other words, that there are no indications that we're going to be anything other than a nation of regions, electrically, and that therefore DOE's ability to stand above the fray and have some useful things to say about what works and what doesn't work and standardization of certain types of rules and regulations and technologies is unique.

No one else can do that as well as you guys can. So I would actually, rather than have that slide that says here's 2010 and 2035, take the regionalism as given.

There's a terrific new book called, I think it's called American Nations by a guy named Colin Woodard. And it actually breaks the country up into cultural regions and they're quite similar, actually, to our

electric regions, which is just stunning and accidental.

The other issue that I'm just fascinated by is the natural gas issue. And we've talked about this a lot in New England. In our short term investment sort of way of living that we have, I wouldn't be surprised if ten years from now, 100 percent of our electricity is generated by natural gas in New England.

And one of the things that DOE might do, is to be the guardian of the idea of portfolio and risk diversification. That why couldn't you be the folks that say to the regions, watch out what you're doing.

FERC does a little bit of this, but could do more than it does in terms of saying do you really want to be 100 or 90, 80 percent dependent on a single resource who's price today is fantastic. But 20 years from now, who knows.

MR. CURRY: Rich, can I just

footnote that? One of the things to keep in mind with all shale development is the enthusiasm for a variety of parties, most recently Dominion at Cove Point to get clearance to put shale gas on the LNG world market.

So while transportation and ease of access can keep it at four or three or actually the last quote I had from our gas folks was 198.

That ain't the world market, folks. That ain't the world market. And I have one of the Commissioners in Maryland that I would have it in for them if they let that go through, but that's another story.

MR. KELLIHER: Just one brief comment and then a medium comment. Just on the brief comment I thought the EPRI Prism studies are worth looking at.

So if you're looking at, trying to get the right bounds, I'm not going to talk about Slide 2, anymore. But I thought the

EPRI Prism boundaries are probably pretty good and pretty credible.

And I think they'd be a little bit different than what you laid out. And just in terms of the medium comment, you know, it's, you did a brave thing and a vision is a vision and it's always, it's hard to try to lay out some vision of what the grid should look like, unless you know what the electricity supply is going to look like.

And there's more uncertainty, I think, today on what future electricity supplies are going to look like and probably any other 20 year horizon that I can think of.

And there's also more uncertainty on the other end, what demand patterns are going to look like, and there's more uncertainty about technology energy than probably any other 20 year period.

So, one thing though I would suggest is I think you understate the institutional barriers and I think others have

made that point. And one way graphically you could show that is on your Slide 3, of a big red arrow going in the opposite direction of your four blue arrows.

Because, and maybe an arrow that's bigger than those, not all, bigger than all four combined, but maybe bigger than each of those four.

Because I agreed there's a need for change in the grid. They're not driving changes in the grid, they're driving a need for the grid to change.

But, if institutional barriers prevent that change from occurring, then the need hits a wall. And when I say institutional barriers, I'm not pointing to my former colleagues.

I think it's things like, institutional barrier to me is, in part, the ownership structure of the grid, right. We have 500 donors in the grid and a third of the grid is owned by the Government, including our

hosts.

Well, our hosts, NRECA hosts as well as U.S. Government hosts. And so, and I just don't think they react the exact same way as a for profit company.

Most of the grid is owned by vertically integrated enterprises. If you look at how the grid is sited, it's sited under laws that assume local delivery.

It assumes there is no interstate grid. So, these are all huge barriers. Questions like how do you get your money back when you make a large investment in a transmission project that provides broad regional benefits.

That is much more mysterious when it comes through the grid than in other areas. So there's huge institutional barriers. I think that's one way you could graphically show that.

And I would love to think that there will be standardized citing and

permitting processes in the next 24 months. But that is a -- I'm going to go out on a limb and say that is a zero percent probability and you might change that time frame to years versus months.

(Laughter.)

MR. PARKS: The issue is how can we push that space? That's really what we should convey.

MR. KELLIHER: But this is laid out as an institutional direction, 24 months, I thought it meant this is going to happen or this, we need this to happen.

MR. PARKS: But we didn't say it, well, the point is valid thought, absolutely.

MR. KELLIHER: So that, those were my --

MR. PARKS: We're not going to solve those in 24 months, I totally agree.

MR. KELLIHER: I agree. And I guess I'll dispute Sonny just slightly. I mean I, stakeholder processes are wonderful

but if you have, no one can actually make decisions and everyone can offer an opinion.

I think stakeholder meetings have a natural limit to their usefulness if decisions never occur. And the fractured nature of decision making, at least at the regulatory level, is pretty stark.

And part of it is another institutional barrier, it's just the nature of traditional rate regulation. It is not very friendly towards technology.

So there could be fantastic technologies, and if a regulated company gets, has a regulator that denies the technology employment, then it doesn't occur no matter how good it might be.

Or if the utility actually doesn't earn more from the deployment than it would using an older technology, what's the point in making deployment.

So, I just think the institutional barriers, they do, they will at the very least

slow down change, if not actually prevents it all together in many respects.

MR. PARKS: If I may just comment, I would say that on the team, and we had diverse, we had people from basic science all the way to, the team actually would agree with you, even the basic technology guys are like, yes, institutional in terms of, if there's the number one thing to solve, that's the thing to solve. And I did not communicate that.

MR. KELLIHER: Yes, just classic rate regulation will produce and preserve the black rotary phone for decades. I'm not saying that's what we have on the electric side but it just, the nature of regulation.

And I say that as recovering regulator. So, those, I think, those are just, I think there's more institutional barriers than you identify.

I think they're a bigger factor and I think they're actually, graphically should be seen as, represented as an arrow

going the opposite direction. Thank you.

CHAIRMAN COWART: Bob, do you have an additional comment?

MR. CURRY: I'm be quick since you were kind enough to give me time already. I heard both Bill and Sonny talk about customer choice, as well as Mike.

We're grappling with that right now in New York, where the Bank of America tower, built on 42nd Street and Sixth Avenue, has a pretty significant CHP operation with very little subsidy from the state.

They just did it as a marketing tool developer. So what does Con Ed charge them to backstop the trading floor for Merrill Lynch? When you start talking about customer choice and distributive generation, is the expectation that the local level, that the Commission is going to try to keep the lights on?

And, if so, do you have built in redundancy or do people, if they're going for

distributive generation, take the risk that they may foul it up.

And as someone in Louisiana said around the Arab oil embargo, let the bastards freeze in the dark. You know, so it's, that has to be addressed, I think, as a financial issue and as a scope issue for the responsibility of the incumbent regulators/utilities, delivery systems, whatever.

Because we are forcing right now, Con Ed to grapple with the idea of backstopping that because we, as a city, would have incredibly reliable service in Manhattan, but the Bank of America/Merrill Lynch trading floor means something to us as a financial capital, so we have to address that issue, and believe me nobody wants to.

So that's another thing to get in there as a thankless task.

MR. WEEDALL: So, Bill, I saw words up there that led me to believe that you

guys have this on the radar screen, but I think it would be good to emphasize, because we're just getting a lot of bang for our buck in this and that is looking at the non-wire solution, non-construction alternatives, et cetera.

You know, it's been very well eloquently spoken to today about the increasingly difficult challenge of getting transmission cited, et cetera.

We certainly have been experiencing, you know, a lot of that. And, once again, I'm just seeing, you know, that we've made a huge institutional leap and, you know, taking that out to others.

So, again, you know, the efficiencies that have been talked about, in any number of ways here, again, it's going to just, these three projects that we currently are working on, I mean easily could be saving us about 150 million dollars.

MR. SLOAN: One of the joys of

speaking later is that most things have been said, and one of the frustrations is that you have most things already said.

To follow up on some of the earlier comments and I, Bill and I talked during the break. I thought that there was insufficient attention to the use of transmission innovation to better use our existing corridors.

Whether you're going to do AC/DC interconnections and bury lines or whether you're going to do 765 or greater AC lines and take out a lot of the undergrowth and improve the visual scene.

I think that we need to be having the Department look at some of those things, in terms of that toolbox. And then post-stimulus money, I think that we still are going to struggle, institutionally, with facilitating policy maker education to encourage and reward first adopters.

I mean they're going sort of back

to, I think it was Ed that, no, it was Mike that talked about the natural reluctance of engineers to make change and certainly regulatory and policy makers in general have that same attitude.

But somehow we've got to convey that the customer benefits are not going to occur if everyone waits for someone else to do it. And you don't want to be first.

And you don't want to second, you want to be fifth. And then Gordon touched on it and that's the Department helping with standards and interoperability efforts with NIST or GWAC or the Department, per se, but making sure that all the vehicles and all the electric chargers communicate and are interchangeable.

That, that is doesn't matter which vendor I go to for my whatever, they're going to be able to fit into the system and work.

And I guess I, even knowing less than Bob does, from an engineering

perspective, the Department certainly can lead in terms of research and facilitation and encouragement and technological exploration, but I don't see anyone else who is really going to engage in the education.

Not necessarily the public, I mean the great unwashed masses out there, but you've got to convey that short-term decision making which may hold rates down, may result in larger long-term costs.

And that it takes a certain amount of boldness and leadership and that's not the say give the consumer, but to say consumers we hear you. We recognize uncollectibles are rising, but we have got to invest in that future.

MR. PARKS: If I may respond to one part of that. We have struggled with, I agree on the education, but it would be really, both, we should emphasize it more.

We have struggled to get support to do that. Because people see it as a

Department of Labor issue or they see it as, you know, not a traditional technology-based agency's view.

And somehow, if there's any advice on how to think about that differently or help to convey our messaging differently about, that would be extremely helpful to us.

MR. SLOAN: Well, again, to follow up on that, you and I briefly talked and Pat and I talked on a small project that you fund, help fund, your NARUC, do allow some PUC Commissioners and some very carefully selected state legislators to look at how technology, transmission technology may be able to address their needs.

You know, and in several side conversations I said that it's not necessarily the economic difference in whether your invest, does it save you political and time costs in addition and as you address congestion or liability or whatever you are trying to do. And so, I guess, the education

aspect for me is focused on the technologies and how technology can help solve problems.

Corollary, you know, but yes it will probably cost more money to bury the line than it will be to run it overhead. If you can't build it for three years, because you're stuck in litigation and you have brown-outs or black-outs or, you know, other constraints, you haven't won.

And that the regulators and the governors and the people like me, have got to understand that sometimes paying for something, technologically, and allowing the companies to be innovative and even recognizing that everything is not going to work as well as they had hoped and not punish them for it.

But that to me is part of the education of the decision maker, and should fall within the Department's purview.

CHAIRMAN COWART: Wanda.

MS. REDER: Yes, Bill, first of

all, good job. I think this is a real holistic view and it articulates the technology and where we need to go quite well.

And my comments aren't necessarily on the PowerPoint itself, but more: now what? And I think that really has a lot of implication on how well it can get socialized and implemented.

So, within that, we've talked about the grid kind of being between generation and consumer and there's a lot of variables throughout the whole thing.

I think we're going to have to expand beyond our traditional boundaries in order to get us a vision that we can gravitate around.

And I do believe that we're going to have to involve the consumers more in that process. You know, to the extent that they want to do the same thing the same way versus, you know, get into a world that truly is sustainable and more efficient drastically

alters what happens between generation and the consumer.

So, somehow, I really believe that that's an important piece. And others made the point on nuclear versus natural gas on the generation side.

So even though we like to draw that red box around what domain is the domain, we're going to have to get a little blurry on the edge in order to, in order to get a vision that we all gravitate around.

Now, do you want to comment on that, because I've got some others to.

MR. PARKS: First I agree with you that those boundaries, and yet at the same time, we have to boundary activities.

MS. REDER: Yes, right.

MR. PARKS: There's always, I mean you could go infinitely. And so the key is to study and understand, from our viewpoint, where those interfaces are that we have to work on from this side and who do we have to

engage on, if it's another side of the interface or the interface itself.

But I think that's a huge issue. And traditionally, DOE is not good at non-stovepipe activities. And we're trying to break that. But it's not an easy thing to do. Either in the side of DOE or working within the industry.

MS. REDER: Yes, that's a good point. I do think that rather than taking this document and saying, okay, here's a vision now comment on it. To the extent that we can find a way to regionally involve people to get to, and might accomplish a couple of things. Because you could ultimately get folks to a consistent vision and, in the process, provide some education, because they become much more aware of the ramifications.

And many times when you have that basement conversation, folks don't necessarily have an understanding. And so they give the response, knowing what they know.

So perhaps there's a way that we can create a stakeholder base and, you know, and an involvement process that can accomplish a couple of things in the process.

Another comment that I have been wondering about, is the whole modernization aspect. I think, generally speaking, we have underinvested and the assets, on the whole, are aging.

And I think that we need to figure out, if this is our vision, you know, what is the investment that it's going to take in order to turn that corner and actually get the appropriate technologies inserted at the appropriate places so we're positioned for the future.

And, you know, I think more of an understanding of the rate of aging assets and the implications of different scenarios around like for like versus a truly, you know, modernized with the most efficient and highest tech, would be very useful to facilitate

conversation.

And then that kind of leads me up to, you know, the whole substation demo. I like the idea of a demonstration, but I agree with other comments that I think it goes much more beyond the substation, the distribution system is likely going to become very dynamic along with storage and we've got to figure out the interoperability of the whole thing.

And if we just isolate it to the substation alone, we're probably not going to get what we need.

MR. PARKS: This is a communication issue more than a difference of opinion. Because we were using that focus to talk about where all those things happened.

And it's not that it all happens at the substation, but it's the linkage. And so, whatever the mechanism, and we're open to, where that activity happens that you're talking about, is what we're after. It's how do you get all that to tie together.

How does it, where does that happen? Is it a single point or is it really, how do you get that seamlessness. And that's the concepts are what we're after, not the focus on especially what you would traditionally consider a substation.

We need to explain that better from our view.

MS. REDER: And I get, yes, but the last point in the slide that had the next steps, actually said, you know, wrap up with some lessons learned on the stimulus projects and I actually think if we move forward, I think it might have been the slide before that or before that. There you go.

Leverage prior work within 60 months. And I think that if we moved forward, sooner rather than later, both on promoting the successes, that's a very useful exercise and there are certainly a lot of success that we can advocate now.

And the other is there's likely

barriers that people have been very challenged with, and that can be fruitful for us to channel efforts in order to remove them. That's it.

CHAIRMAN COWART: And Ralph.

MR. MASIELLO: I'll try to be brief. One thread through all the comments has been the amount of uncertainty and looking at, and setting up a vision for the future, right.

We've talked about gas prices, nuclear or not. You know, another obvious one would be an oil shock, it's not unlikely and that would change the EV picture dramatically, right?

The thing that the utility industry is really bad at, is understanding uncertainty and putting a value on flexibility.

We don't have the planning mechanisms to let us essentially say this transmission line is more valuable than this

other one. Even though in our primary scenario, that's not the case, because it gives us flexibility against future supply issues. Or today future demand development, right.

So there's a huge gap there and how do you assess and then put a value on -- I'm going to use a bad word and say optionality. But right now, in the storage space, the valuation problem gets completely wrapped around that, and there isn't a state utility commission in the country that's prepared to accept the valuation that's couched in Wall Street language.

But this afternoon's discussion kind of convinces you that transmission planning, distribution planning all needs to be put in that framework, too.

CHAIRMAN COWART: Pat.

SECRETARY HOFFMAN: I'm just going to add to the discussion and start off that, I mean, I think we all recognize that

predicting the future is near impossible and change is tough.

But going after what Mike said, I think you were very insightful in some of your comments. And that what we really need to do is continue to strive for additional capabilities, so we can make decisions that are built on analytics, you know, cost benefits.

And really start building, I think the information and availability of information in the future may change expectations by customers, by regulators, by states, by regions.

And that is something that we'll always have to, as more information comes out and as more people start taking a look at that data, we'll start to get a better understanding of some of the directions.

But going with expectations I think that is what Sonny and others talked about is really where we're going to go after.

What is the expectations of consumers in the future. And how are they going to define that expectation. It's something that when we went through this exercise we struggled with, is what are the metrics? What are the future metrics that we should look after or look for when we talk about the grid of the future. And we struggled with it.

It's not a simple metric, it's a series of metrics, but it comes down to what is the expectations from consumers. And I would say also, what is the metric as we continue to evolve with respect to reliability and interdependency.

I mean we're talking about reliability metrics or the electric infrastructure, it's going to start spilling over to what is the metric on the gas infrastructure. And we're going to have to look at more of the interdependencies of those infrastructures as we pull them together, so I can see things coming along the lines where

we're going to start having expectations with respect to the gas infrastructure because it's going to effect the electric infrastructure as we move forward.

One of the things we talked, I believe that it's going to be a regional approach as we evolve the system. I'm going to look at regional assets. We're going to look at the balance between central and distributed. But the thing that I guess I would like to advocate or ask you all to think about, is even though we're looking at a regional development, that we continue to have visualization or analytics at the n+2 level.

So that you're looking at yourself plus the regions around you, to a certain extent beyond just, you know, the region itself. So it's really going insane. Okay, we can look at and develop regionally, but make sure when we're looking at reliability or visualization or as we look at anything further with analytics on the system that

we're doing an n+ something perspective.

And I think that ties to some of the interoperability comments. You know, one thing when I kind of came in this position, is I started out by saying, you know, there's a lot of uncertainty.

And I was hoping that the Department of Energy would lead efforts to provide clarity and certainty. I think I failed miserably.

If anything, we've gotten more confusing and the industries are struggling still tremendously. I don't know how to bring a resolution to that, accept that I think it goes back to more transparency of information or more communication in how we're doing business.

Which goes back to larger balancing area. It goes back to really how do we tackle some of those difficult issues of coordination and communications across the seams.

CHAIRMAN COWART: Well, we have David and David this, each thought is giving a rise to new thoughts.

MR. R. MEYER: I've been struck so far at how there's been, no one has mentioned the availability of R&D money. And we have to take that pretty seriously.

That is, if the availability of R&D money is a problem, it makes it all the more necessary for us to have a clear sense of priorities and I'm hoping we get, we cast the net broadly and get as much input as we can about how do we address this range of possible R&D topics, R&D projects, with limited funds.

Which ones are the real priorities, where are the synergies between some of these things. Ideally, we'd like to pursue a number of things in parallel, because you never know exactly where the breakthroughs are going to come.

So that is an argument for not trying to pick, not trying to overprioritize.

So this is going to be a major dilemma and we're going to need all the help we can get.

CHAIRMAN COWART: Dave.

MR. NEVIUS: Thanks. I was trying to remember a presentation that NERC had from a couple of university folks, a number of years ago. And I finally found the reference.

It was Clint Andrews from Princeton University and Stephen Connors from MIT. And Steven Connors runs a group called AGREA. I guess it stands for Analysis Group for Regional Energy Alternatives.

And I don't know, Bill, whether you're familiar with their work, but they talk, they came and spoke to the NERC Board about multiattribute scenario analysis.

To bring together people with various positions and desires to reach some agreement. And then had a technique to go about doing this. And it sounds a lot like what we're trying to do here. Instead of prescribing a centrally planned solution or

letting everything come up from the bottom, it brings all of that together in a framework that allows people to reach agreement.

I don't know whether that would have any value in this exercise or not. But I know I was impressed at the time with what Connors and Andrews presented. I mean Clint is not longer at Princeton, I forget where he is now. I think he's at Rutgers. Stephen Connors evidently is still at MIT and he runs this program which, it's pronounced agree, even though the initials are AGREA.

So I recommend at least looking into that.

MR. PARKS: We will do that. I am a little familiar and have been involved a little bit with planning like that.

For example, there's an institute, called the Millennium Institute here in DC, that works with countries around the world and also localities, on looking at what are all the variables that affect things, what kinds

of people, that sort of thing.

It's a multi-layered and they go through a series of developing different kind of things.

And I was also involved with Maui County in doing that that. They look at energy issues, they look at water issues, they look at agriculture issues, and tied them all together in their process of doing that.

And those are very powerful tools. And lastly, Sandia and some of the other labs are working, we're doing one project for the energy, water and access issues that are, they have some really neat front-end tools that have a lot of embedded data in them.

But the front-end, dashboard, if you will, is just fairly easy for decision makers to say, okay, if I want to such water out of the Rio Grande Valley, it's going to have this impact on agriculture and this impact on that.

And there's some very neat things

in that space that I think would help decision making. We should continue to look.

MR. VAN WELIE: Yes, Pat, just listening to you sort of describe the struggles of trying to articulate a vision, made me wonder whether you shouldn't take it from another angle, which is to say don't bother trying to define some end state because whatever you define is going to resisted in some form or fashion.

And there will always be a million reasons why it's a little different from what you've put out there. And so rather than trying to define a vision in physical terms or in terms of outcomes, define it in terms of the principles you want to say embodied in the regional solutions. And building a little bit on, I guess, what Ed said, which is in one of the principles could be this notion of having some diversity of supply, as an example.

Another notion could be the notion of interconnectivity or interoperability. And

so one could then cast for the DOE the role of sort of the adult in the room when it comes to some of these key principles but you leave the implementation up to the regions.

Because I think, for the DOE to try and specify the future, first of all it's impossible to know for sure what this is going to be.

The jurisdictional set up that we have is going to make it impossible for you to even do anything about it. So, you'll just be continually running at a brick wall.

Maybe you can define it in a different way and be successful by influencing on sort of, you know, three to six different principles and sort of driving those issues home.

In addition to perhaps picking certain technologies that you think are close to a breakthrough and might, you know, dramatically change outcomes and sort of focus on trying to stimulate R&D investment in those

areas. Just a thought.

CHAIRMAN COWART: Oh, I see, this conversation has to come to a close at some point. Ten seconds granted.

MR. KRAPELS: David made a very important point. It would be very helpful to the committee if there was some way of presenting the R&D options and dilemmas a little bit more starkly than was done here, where it's fairly aggregated.

So, anything you can do about that, would be great.

CHAIRMAN COWART: All right and I guess one final comment. I'm channeling Pat here, is on the nature of this document and the process and the conversation is to emphasize that I think we all see it as a living document and a conversation, an ongoing conversation, that may end up, as a number of people have noted, being regional in nature, as it evolves. And that there isn't going to be a single, perhaps there isn't going to be

a single, national view here. Although, DOE needs to have a coordinated strategy.

But it sounds like the process is going to necessarily continue far beyond this meeting today. And it may very well be appropriate for us to think about this as one of the organizing tools for our 2012 work plan.

I'm just conscious of the time, trying to keep us on schedule. And I know we have at least one member of the public who has asked for an opportunity to address us.

And so I'd like to turn to that right now. As you may have seen, you have to be close to the microphone.

MR. BANDERA: Yes. Thank you very much for giving me the opportunity to speak. I'm Derek Bandera with GenOn Energy and one thing, as we talked about the future of the grid, and you consider the work plan for 2012, we're all aware of significant changes that we're going to see on the grid when we talk

about what the reliability of grid is going to be going forward. And one element that may be prime for discussion amongst this group, might be something relating to the transition to the future following the environmental regulations that we see promulgated that wrap out this year.

One reason that I think it might be particularly useful within this group, that as GenOn is a former Mirant Company, it had a run into circumstances relating to the DOE Emergency Authority, which is a took of that, under emergency situations.

DOE can direct generators to run. And as the environmental regulations put some pressures on certain units that may, may find itself not going to be in the marker anymore, trying to retire or in the process of getting upgrades, the importance of that backstop emergency authority is going to be something that people are probably going to be looking to.

And a critical element of that is actually in the instances when it's been used, it really doesn't work that well in the presence of environmental conflicts.

The Potomac River Plant in Alexandria, Virginia, was ordered to run under the DOE Emergency Authority and the plant did run to keep the lights on in Washington, D.C., but it still was penalized and fined for environmental conflicts. And the company was put in a situation where it chose to run, but it was exposed to conflicting environmental regulations.

So, this seems to be a problem that's probably going to be much more highlighted coming forward and it seems like this group, with the, you know, the thoughtful people that are here, would be excellent to discuss and think about what tweaks for the tools, as we make the transition to the energy future and what, going forward, we might want to do to make sure that the transition to the

future is reliable transition and make sure that the lights stay on.

And the environmental requirements that are in place or maintained. Thank you very much for the opportunity.

CHAIRMAN COWART: Thank you, is there anyone else?

(No response.)

CHAIRMAN COWART: All right, then. I think we can declare this meeting adjourned and I think we'll hear from Peggy as to what's next.

MS. WELSH: One housekeeping note. Bill's presentation, for those of you from the public who are here, it's not going to be available until after the NARUC meeting, which is in mid-November.

We have promised NARUC that we would share it with them and would not put it out for public -- for the public, until then. So, EAC members, please hold your copies close.

At the request of the Department we don't want to look bad in front of our state regulator friends, because that promise was given to them.

There is an EAC website, so for those of you from the public, please check the EAC website often after November 15th.

Because that is at the end of the NARUC meeting and we will get it up. DOE also wants to take all of these comments and have the ability to tweak the presentation based on what they heard today.

So, thank you very much. I had given different information out at the front desk, so EAC members and DOE staff are invited to a Dutch treat dinner at Ted's Montana Restaurant across the street. The address is on your agenda.

We gather there at 5:30 for happy hour and dinner is at 6:30. Thanks everybody.

(Whereupon, the above-entitled matter was concluded at 5:05 p.m.)

C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Electricity Advisory Committee

Before: US DOE

Date: 10-19-11

Place: Washington, DC

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

Neal R Gross

Court Reporter