ELECTRICITY ADVISORY COMMITTEE MEETING

Washington, D.C.

Monday, March 5, 2012

PARTICIPANTS:

EAC Members:

RICHARD COWART, Chair

BARRY LAWSON

BARRY T. SMITHERMAN

BRAD ROBERTS

BRIAN WYNNE

CLARK BRUNO

DAVE NEVIUS

DIAN GRUENEICH

FREDERICK BUTLER

GORDON VAN WELIE

GUIDO BARTLES

JOE KELLIHER

JOSE DELGADO

LISA CRUTCHFIELD

MICHAEL HEYECK

MIKE WEEDALL

RALPH CAVANAUGH

RALPH MASIELLO

RICHARD VAGUE

RICK BOWEN

PARTICIPANTS (CONT'D):

ROB GRAMLICH

ROBERT E. CURRY, JR.

ROGER DUNCAN

SONNY POPOWSKY

TOM SLOAN

WANDA REDER

From DOE:

BILL BRYAN

BILL PARKS

BRIAN PLESSER

DAVID GARDNER

DAVID MEYER

DEBBIE HAUGHT

ERIC LIGHTNER

IMRE GYUK

JOE PALADINO

MATT ROSENBAUM

PATRICIA HOFFMAN

From FERC:

CHERYL LAFLEUR

PARTICIPANTS (CONT'D):

From RAP:

JANINE MIGDEN OSTRANDER

JOHN SHENOT

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P R O C E E D I N G S

MR. COWART: Welcome to the first meeting of 2012. I think between us, David and I have some sort of opening comments, and I'm not sure if you want to go first. I'll just start.

So the first topic on our agenda right now is to discuss how we're going to proceed with the work effort in 2012, and to just let you know about some procedural issues and decisions that have been taken by the Committee leadership and by the Department. So I'll just start with a few of those items.

ICF is now supporting the Committee, and we've had the really active support of those folks from the ICF Team, so maybe it will be useful right now to just ask Elliot to stand up and introduce himself and introduce the Team.

MR. ROSEMAN: Hi, we're delighted to be able to be supporting the EAC. From this point forward, I'd also like to introduce my colleague here, Phil Mihlmester, who is the Chairman of our overall Energy Environment and

Transportation Committee, and it's been good working with the various subcommittee teams in trying to make sure that we can make as effective an effort as possible. We're delighted to be here.

MR. COWART: And who are your other colleagues?

MR. ROSEMAN: My other colleagues --

MR. COWART: Sheri --

MR. ROSEMAN: Of course. We've got Sheri Lausin and Paula Kline here to help with a lot of the statistics, and they have been doing tremendous work. For example, we didn't even have water on this table, the coat rack, I mean, just look at that. So, please just ask us for anything.

We also have, as you may see, technical experts in the various areas who are at your disposal. Thanks.

MR. COWART: Thanks, Elliot. We've already seen quite active engagement by ICF in supporting the subcommittees. Subcommittee members, obviously, have already experienced that, and we're looking forward to more of the

same as the year goes on.

Also by way of introduction, I'm really pleased to announce that Sonny Popowsky has agreed to be the vice chair of this Committee, and do you want to say anything?

MR. POPOWSKY: No, but thank you for the honor of asking me to serve, and I'll just fill in whenever Rich breaks his leg or something, I'll be here. I have to say, my first conversation with Rich about the Committee was, he called me at home in Philadelphia at about 9:00 or 10:00 at night a couple weeks ago.

And he was calling from Brussels, which made me realize that it was 3:00 or 4:00 in the morning when he was calling me, so I know Rich has been very busy, and I'll try to help him out wherever I can.

MR. COWART: Well, aside from when I break my leg, actually, getting advice and counsel from Sonny any time is something that I've valued for years, and will continue to value.

We've also, as some of you know,

made a decision that it would be really useful to assist each of the subcommittee chairs by having a co-chair or vice chair for each of the subcommittees. And I want to make sure that we have all of those names lined up before I announce them all, but I'm pretty sure that those are all squared away. We'll let each of you know who they are.

But we're going to have a leadership team now that consists of chairs and vice chairs for each subcommittee, and myself and Sonny, along with David Meyer and with staff support with ICF, and also staff support from RAP. And it's useful to, I guess, at this point, to introduce you to my colleagues who are assisting also with staff support for the subcommittees.

So, Janine, want to stand up and say hello?

MS. OSTRANDER: Greetings, it's a pleasure to be here, and I'll be happy to work with all of you on transmission and other issues.

MR. COWART: And John Shenot?

MR. SHENOT: Well, I'm John Shenot, and I'll be supporting the Smart Grid and Storage Subcommittee.

MR. COWART: So we've been discussing with Elliot and the ICF team how we can provide some serious staff support to the members of the subcommittees. One of the things that we heard last year and in previous years from committee members is that it is just really difficult for the committee members, personally, to do all of the work necessary to produce these reports.

So we're looking for a system that allows us to get the work done with more staff support, and use the committee members themselves for your expertise, your insights, all the knowledge that you bring to the table, as opposed to expecting that you're going to find the time to personally write all the words that are going to go into the committee's work products.

MR. MEYER: We realize on our side, the DoE side, that in order for the committee to be effective, there have to be strong

working relationships between the various subcommittees or task forces, and the relevant staff experts across the department, not just people in OE, but people elsewhere in the department who are relevant to one or another, subject of interest to the committee.

And it's our job, DoE's job, to make that happen. We can't expect you folks to be already somehow familiar with how DoE has decided to organize itself to deal with one or another topic. So we are mindful of our responsibility there, but I emphasize, we do want an ongoing working relationship.

But I then have to qualify it by saying that there are some of us, some in our general counsel's office who have said, watch out, we don't want the subcommittees to be advising DoE; advice to DoE is for the full committee.

And I said, understood, the conversations between the subcommittee people and the DoE people are preliminary, and that formal advice and recommendations are always provided by the full committee. So just bear

that distinction in mind.

MR. COWART: Do you want to say anything about the individuals who have been named so far as liaison?

MR. MEYER: We also have, within OE, for each of the three subcommittees we have named staff-level individuals who, in most cases, a senior-level person and then a more junior-level staff person. So there are two people, then, for storage, two people for transmission, two people for Smart Grid. Why don't you say who those individuals are.

MR. ROSENBAUM: We'll start with the Transmission Subcommittee, because they're both here, if they could stand up: Michael Lee and Katlin Callahan in the back; on the Storage side, we have Henry Youk and Rash Nahanda from Hank Kenchington, he's their boss from the R&D side; and then on the Smart Grid side, we have Joe Paladino and Eric Lightner.

MR. COWART: Are there any questions from the committee at this point on how we're set up, how we're going to proceed? As you can tell from the agenda, tomorrow we're going

to be diving into the proposed work plans for each of the subcommittees, and happy to report that a lot of work has already happened even before our first meeting of the year to get those draft work plans going.

And we'll have that discussion tomorrow. But anything, any questions at the moment about how we're organized, what's going to be happening? We're planning, you know there are three meetings planned for this year, the dates are set. ICF is looking for locations for the other two meetings, they won't be here --

MR. MEYER: No, they are --

MR. COWART: Oh, they are set?

MR. MEYER: Yes, Capitol Hilton. Very nice space, but we still prefer the space at NRECA when available.

MR. COWART: So now we've decided that, for 2013, we're actually going to mold the entire committee's agenda around the availability of the NRECA space. But we think we can probably work that out. Okay. June 11, 12; October 15, 16. Capitol Hilton?

MR. MEYER: Yes.

MR. COWART: All right. Well, normally, at this point in the meeting, this is when we turn to Pat Hoffman, and she will then tell us what's going on in OE and what she's thinking about the vision for the Department and the Committee. Instead, today, I think due to issues having to do with the budget, Pat's not with us, but instead, we have David Meyer and Bill Parks.

MR. MEYER: Okay. Pat was going to say, first of all, that she appreciates the hard work that the committee did in 2011, produced a very strong list of work products, and we're mindful that you rightfully expect a detailed substantive response from DoE with respect to work of that kind.

So we systematically went through all of those work products and pulled together response material, and that has been districted to you already. I don't propose to go through it in detail here; I think we need to be looking forward, not retrospectively. But if you do have questions about the

responses that were distributed, by all means, let us know, and we'll deal with them.

From there on, Pat was going to talk about the priorities for the Office for the coming year, and I'll respond to your questions about those priorities. Bill and I don't feel that it's appropriate for us to try to do that. The presentation that Bill is going to make, however, as you know from previous version or previous discussion, is fairly broad, the DoE Grid vision.

So, in its way, it does; it's broad enough and inclusive enough so that some of these priority questions can be addressed that way. So the way we're going to proceed in Pat's absence is to say that, to the extent you have questions about priorities, and if Bill feels comfortable answering them, he will. And the same for Hank, and perhaps Bill Bryan, when he gets here tomorrow.

But if not, if these are questions that we should simply defer and we'll take note of them and get back to you through some other channel later, when we can.

MR. PARKS: If I could just add a couple things. First of all, Pat's not here, but we are here in presence and in force today, so I want you to recognize and Dave mentioned Hank Kenchington is here, he's the Deputy Secretary for R&D. Brian Mills is here, Brian, if you will raise your hand. He's the Acting Director of PSA, the Policy Shop.

So if there's anybody you want to ask questions to, we'll be glad to take a shot at that. And Pat gets final call on all the answers, but we certainly have a lot of people to have dialogue with. I'd also like to introduce Jay Casberry, who is on loan to us from the Southern Power Pool, and advising us on transmission issues, we're kind of bulking up right now on what our capabilities are.

And Anjan Bose -- I'm not seeing -- Anjan Bose, if I may, is also joining DoE to help with electricity issues from Washington State University. So I think one message Pat would say is we're trying to increase our presence in the Grid space, and I think it's

something that these people are going to help us do. So I wanted to acknowledge their presence, as well. Thank you.

MR. COWART: Also, before we get into Bill's presentation, actually, I confess that I've already begun to treat Commissioner La Fleur as though she's a member of the Committee instead of an honored guest. I do want to welcome you to the Committee. And to acknowledge that, I think largely through your initiative, as well as the Committee's invitation, that we made a point of inviting FERC.

And FERC made a point of wishing to be invited to coordinate with this committee, and Commissioner La Fleur is showing up herself to be that point of coordination. And maybe you want to say something about that?

MS. LA FLEUR: Well, thank you very much, I'm very happy to be here. Bob Curry, whom I don't see, I'm making note of that, was the one who thought I should be here, and have worked with Pat and David. And the wheels turn slowly, but I responded, and I guess the

concept is that I will come to as much of the meetings as I can, and involved other FERC staffers in projects, as appropriate.

And, based on the one meeting I attended, which was last summer, when I was there with Terry Boston talking about Storage, it seems like a great group, and something that we should be a part of. So thanks for the invitation.

I'm not a voting member, whatever that means, I'm just an observer, so to get out of any ethical issues, that was the ruling. Thank you.

MR. COWART: And thank you for being here and for facilitating the coordination between DoE and FERC and this committee.

MR. MEYER: We are discussing with the Secretary's staff a suite of new appointments that we hope will be in place before the June meeting. But as experience shows, this is a slow process, so we hope it works out that way, but we'll see. But we're mindful that, in some areas, we need more expertise on certain subjects on the

committee, so we're trying to strengthen those areas.

MR. COWART: All right. Bill, I think it's up to you now.

MR. PARKS: Well, just before I start this, any questions from what was said by Rich and David, any other questions? Okay, then we'll go into this.

Thank you for having me back. I came last time and I talked about what we're doing internally, the DoE, and starting to talk about a vision process for what the Grid might look like in the future. And what I wanted to do was come back and give a status of what we've done.

We've kind of said we would have public meetings; we've done that. This would be a focus of the National Electricity Forum; it was. And so I just wanted to come back to some of those issues that were brought up, and you used those a little bit as a platform to also, I think, talk about what are things that the DoE is doing.

We kind of raised the question, what

should the future Grid look like; the questions on the bottom of how do we enable consumer participation, all the things that have been in play that many of you are familiar with. I'm not going to dwell overly on the things on the slides, I just want to hit them, kind of highlight and talk some about it at the end with you.

So it's complicated space, what's the role of industry, regulators, of consumers, and of DoE, and how does DoE fit into that. And those are the kind of things that we want you to think about and help us and provide insight into those things from your perspective as we move forward with what could be a pretty complex set of issues and a pretty complex process.

When we talked about our Grid tag team -- and I can just spend a minute -- it has representation from across DoE; Office of Science, ARPA-E, the applied programs, the EERE, fossil energy, OE groups like the Front Office that are part of that, and some special people, like today, that have been brought in

to help advise those kind of situations.

But starting, actually, to expand a little bit, it's starting to get a little more voice in things. We were part of the RP side last week, had a presence there and were able to start kind of some communication from a broader perspective about Grid issues than any one single office has in the Department.

We continue to say that it's a balance of policies, market and technologies in this, so as we have the things coming out of ARPA-E, if you look at the power electronics projects coming out of that, if you look at some of the Grid related activities that were started since we met last, those things are part of what we're looking at, and how do we get those to play within the DoE structure, and, more broadly, how do we get into the marketplace that actually does things.

And those are the kind of, again, topics that we're trying to spend time with. And we'll leave, of course, a copy of this with you so that it's available to everybody.

Last time we talked, we spent some time on the things on the left, the changing supply mix. This is kinds of recast based on some of your comments that we had.

And we did talk to you, we did talk to NEF, we did talk to some other forum that we've had. But the changing supply mix, the demand transformation, the Grid complexity, and the infrastructure vulnerability are all increasing as we think about what's happened over the last decade, and they're all increasing in a nonlinear way, and there's connectivity between all of them.

So despite all that complexity, we need to deal with it and figure out forward. So we've thrown a straw vision up, we've been going through this stakeholder feedback and input process. And at this point, probably a thousand people have seen this, if you take into account the forum, the public medium that we have held, other meetings that we've held, especially with you, all play into that.

And where we're headed toward, and we don't exactly have the path laid out, we're

still getting feedback of the last few weeks from the meetings that we've had about exactly what is the path forward. We've talked about possibly doing some more regional meetings, possibly seeing what the need for those are, that kind of thing, how do we engage, continue to engage.

And it factors into, not just what we're doing, but as part of what was put into the budget. They all kind of merge together. What we're talking about here and what you see in the '13 budget kind of complement fairly well, if you look across DoE. At the end, we want to see an implementation plan laid out, some role definition played out.

And exactly how that unfurls is TBD a little bit. And the timing of that -- these are obviously -- this is an election year, things get a little different in election years, as I'm sure you're quite aware, and we continue to work at a longer-term approach to things, despite those kinds of issues.

I wanted to mention, this was one of the workshops that happened, this is a future

Grid workshop that PSERC had put on for OE, and we kind of joined together with that in looking at future Grid issues. It was a great meeting. I was not personally there, Ben Weldon was there, but they looked at things like what are credible scenarios for the future, what would the architecture look like, what do we need, super engineers, that kind of thing. And looked at it, really, a little bit more from an academic focus. So we had your focus, we've had public commissioners type focus with EMF, we've had our workshops, a broad variety of people, including people from the utility industry and service companies, that kind of thing.

And what PSERC has also done is they continue to put on -- they're putting on a series, I think, of seven workshops, if I recall, that are called webinars. I think the second one is tomorrow, if I recall. And through now and June, there will be a public meeting in June here in D.C. at the end result of that.

And we hope to use input from that

process to feed into where we're going overall as DoE. So it's a very credible and very important set of activities that they're carrying out as part of the broad DoE looking at where we are going with the Grid.

This is, on the left-hand side, if you recall, the DoE's strategic plan listed out some relatively short term goals for OE in particular, although the broad goal of 80 percent clean energy by 2035, and on the right-hand side was the vision that we had put out.

There had been a lot of discussion around the vision, but in essence, things really haven't changed, despite the feedback from all those people that looked at it, the question of different priorities, different cast of things, as you brought up in the last meeting, the natural gas play, what does it look like, the importance of that in all of this continues to be -- but at the end of the day, this really hasn't changed from what you saw a few months ago. And I think that's kind of significant, because we're not saying we've

captured everything, but we are saying that people can identify and find themselves in this a little bit, and probably have a foundation for how to move forward in this.

So your feedback on that, and the validity of those statements would also be appreciated. But, again, some of the things that we want to hit, and I just wanted to highlight a few things graphically, make it a little more interesting is, we talked about a complex world where we have interconnected things, we have things like microgrids for different reasons.

We may or may not connect in how they connect; it may look different in the future. And as we talk, I'm going to throw in a few things since Pat wasn't able to kick this off, and we continue our microgrid work within OE. It continues to be an effort there, joint with DoD on the SPIDERS Program, those kind of things.

The SunShot Program continues to look at PV, whether it's rooftop or whether it's on commercial building space, those

efforts continue. All the things needed to get that into the market, needed to move advanced technologies spinning out of SunShot into that, different kinds of storage type systems, different kinds of sensor systems, what do we really need, what does it have to do that it doesn't do today.

Back to what are central systems, what do they look like, what are they comprised of? In the future, what do gen-sets look like, what are small distributed natural gas-fired, or other fired systems come to, and how does this all come together? Those are all things that I think most people would agree, you know, the Phasor work has helped us really identify how time synchronize helps, and things like electric vehicles have its place.

How does it all come together? I think a lot of people would agree, yeah, those are all components. Now, how do we get the next things? And as David and others' work has been with the states, and the companies on the interconnection discussions, and the

scenarios that are coming out of the interconnection also plays into all of this, and what are the priorities that someone could take from that ultimately.

You're not going to get that answer in this set of round of what's happening interconnection, but it's going to set the stage for those discussions, I think we sincerely hope. And so it's how do we take all of those inputs and try to move them forward.

One thing we talked about, seamless integration, that really means different things to different people. And in some ways, when we talk about it, we're talking about how we've really got a system that talks all of the electricity issues, all the data issues and all the pricing issues and merges them in a way that works and doesn't create vulnerabilities within the system.

So, clearly, you have to have nodes that protect cyber information, clearly you have to have things that protect physical infrastructure, but at the same time, how can

we ultimately move to this, despite your market set up, which we don't think is going to be consistent across the United States, and certainly, the short term. So how do you do that, embed all of the things that you can about this within your situation or regional basis.

We talked about AC/DC hybrid systems and I think the interest in that is growing as we look at what are the solution sets, can we go back and retrofit the existing rights away and avoid some of the issues with siting, can we think about offshore DC help on the east coast, as an example, to use different ways to do it. How does DC work at the distribution level, can we really think about gaining those efficiencies, having inverters throughout the entire system, and think about different kinds of linkage and the way we tie things together.

I think that continues to be something that people show a lot of interest in. We talk about regional diversity, the complexity of this is crucial, and it means different things to different people. So, I

think what we have, from our viewpoint, we have to kind of embrace some way to look at this regional diversity and some way to tie it in and say it fits this, or this kind of thing fits that situation, and how do we move these together.

So I think it's kind of an acknowledgment by a lot of people that, back to the issue, it is complex, it is state and federal rights, it is all of these different things, it is regional variability, it is great technology solution sets, it is changing business models and getting all of that to play at once. And I think somehow we have to put our arms around that and still find paths forward.

And I think that's really what this is about, from my viewpoint. We had the goal, 80 percent clean energy by 2035, it's going to take a lot of different kinds of technologies to make that work, and continuing to find pathways for these technologies in the future. It is very significant; it's going to take work at the level of the distribution end.

Again, electric vehicles, how homes play, what people, consumers really want, what do they really want at the end of the day. And I think, as you talk about priorities and you look at our budget, continues to be, work I think, others can do on mining the Smart Grid investment, $4.5 billion.

What do we get out of that, what do we learn, what's truly useful from that information, how do we handle all the damn data, excuse my French, to move that, and what are the paths forward? What does it tell you if you're a utility, or if you're a regulator about how you want to plan for the future?

We talked about how the Grid tech team had said there are six areas that we think are focused across that make sense. You can see in the blue below that there's, it says Science and OE and EE are kind of the ones that are involved in all that. I think that gets back to an idea of what Pat would say about priorities, too.

Smart Grid continues to be priority, how do we truly mine and get the benefits from

our investments, and what comes next, what's next in the Smart Grid world? Renewables integration continues to be -- we have the RPS's, it's going to be interesting to see how RPS's natural gas plays in the future. But right now, we have a lot of mandates out there that have to be met, and how are they going to be met, and there's a lot of discussion of different kinds.

I think, again, going back to the interconnection, those discussions about scenarios become very important in this. Advanced modeling, you'll see increased in the OE budget, and in Science budget on activities for the Grid in the '13 budget request. A very important area across the department that we see.

You see ARPA-E also has work in this space, so we're coordinating that, trying to get to a more predictive world in a Grid space. Energy storage, Imre's going to talk to you tomorrow, you'll get a good feel for that side of the activity. Eric Dawson is going to talk tomorrow about the Grid, I

forgot to say that.

But on storage, again, ARPA-E's do work that we're doing, work is coming out even ties to both the batteries, new batteries hub that's led by Science and the activity in EE on transportation all tie together in a coordinated way. Para Electronics continues to show promise, we think there's some breakthroughs that are going to their market, and that could allow for advanced components that you can't really -- you don't see in the market today.

And, last, cyber security is a huge issue continuing to grow, and we have a strong presence and continued strong presence in the OE budget in that, so I think it fits fairly well with the kind of things that we're talking about.

If you take a bunch of inputs and the discussions that we've had, and we had, an MIT study came out and we had a little dialogue at the AC/EEE meeting last month about that, here are all the other things that people want us to think about, kind of things

that tie into this, and say, gee, we should think about more analysis, we should think about how we can help planning for Work Force Development becomes an issue, what is the role with consumers.

I think that everything on here is valid. Exactly how it gets prioritized, who pays for what, and how it's engaged with the entire rest of the private sector becomes critical. And those discussions need to happen, some framework to allow those discussions, say who is on point for this or not. And if there really are holes or white space in these areas, what do we do about them.

And I think those discussions become very important over the next couple years, as we think, again, about a post oil world, and a world where you've got a lot of changes coming at you really fast, whether they're regulatory or otherwise.

We mentioned that, we had talked about an energy hub, it is in the '13 budget request, it's laid out, and we kind of said

this is a little bit both defining and leaving it open for people to bid in. A lot of interest in this about, it's kind of, if we said, right now, we're kind of focused at the substation level, what could replace what happens in the substation plus or minus space.

It talks about what's going to happen in power flow, what's going to happen about what's regulated on one side and what's regulated on the other side, and how those merge in a world were you really get data to markets, so you get data response or aggregated demand response kind of issues. How does that play, how do those things -- this is both -- what are centers where we could really prove out advanced technology.

Because, right now, we're still in the utility world where they don't want to be first, they want to be fourth or fifth, and they want a commercial guarantee on it, because they're putting themselves and their consumers at risk in the real world situation. You can understand that. So how do we deal with it, how do we get some things out there

and test it and try to push the technology envelope in a way that it fits into the market and into the actual system?

And there's blurring of Transmission and Distribution which presents a lot of challenges and a lot of opportunities for innovation and for research. So that's a big request we have coming out of the OE side, with support from the Grid Team, looking at what's next, what's coming next. So this is kind of our focal point to do that.

So next steps: Continue this dialogue, develop a vision document that continues to put stakeholder input in, decide exactly how we're going take regional input and deal with regional input into this, and then development implementation strategies for how we can move forward. Thank you very much.

Any questions?

SPEAKER: (off mike)

MR. COWART: Yes. I should remind everybody that, as always, these meetings are transcribed, so it's important to speak into the mic when you're speaking, for the

transcript.

MS. GRUENEICH: I just want to see if you could clarify a little bit of what I understand this is geared towards a vision of having, I wrote down, 80 percent clean energy by 2025. And is natural gas within the definition of clean energy, or outside? And when you look at the 80 percent, is it down to the level of each utility, each state?

How are you looking at where that 80 percent --

MR. PARKS: That's a national goal of this administration, so that is President Obama's goal that was incorporated into the DoE's strategic plan, and it does include natural gas, it actually includes Clean Coal. So it's a very broad definition of what that is, but it's acknowledging that all things that move toward a less carbon-intense future is really what that is.

MS. GRUENEICH: And is there any goal on the demand side?

MR. PARKS: There is not a broad, national-level demand side goal that I am

aware of. People have talked about different issues and efficiency, and the simple answer is not at a broad scale. If I can point to some things that have been done at the state or regional level, what we did in Hawaii was, we actually set up a 40 percent RPS and a 30 percent energy efficiency goal at the same time, and they are supposed to work in conjunction to get to a 70 percent clean energy.

But at the national level, that debate has not been settled out, and I'm not sure when it will be, frankly.

MS. GRUENEICH: I'll just say, my only -- I'm from California, so we believe strongly in all this stuff, especially energy efficiency. And to the extent that you said that this vision is going to result in an implementation plan, I personally have concerns if it doesn't have somewhere within it also a vision or a goal on the demanded side, because I think that that side of the equation may truly get lost.

MR. PARKS: That's an excellent

point, and it's an understatement by myself, that's actually my mistake, because I would agree with you completely that efficiency can be very productive. We've shown it in the work we've done jointly with California and the work we've done in Hawaii and other places, there's no question about that.

How that's done, how it's structured, how benefits are realized, all important questions in that, but thank you for bringing that up, because I would agree with you. David?

MR. MEYER: Let me add to Bill's remarks, here, on one point. That is, when we talk about an implementation plan, that's strictly sort of a set of next steps for DoE. But this vision is, we want to emphasize at every opportunity, we see this as a dialogue, as a process, and we work with others to help flesh this thing out.

This is a huge matrix, and we've kind of just put a few things into it, but there is a lot of other stuff that needs to be added. So this thing is not in any way

proscriptive, it's important that people understand that. We think it is important and valuable to take it out to the regional level and get -- enlist help from interested people in various regions to -- because we know when it gets executed at the regional level it's going to be different here from over here.

At the regional level, people are always going to say, well, what are the resources that we've got to work from, what are the particular concerns that we have, what are some of the opportunities that we have. And so the particular mix of stuff that emerges is always going to be significantly different, and we can learn from that.

That is, we can learn what works and why in this area and will that successfully map over here, and if not, why not. And what are some of the things that are going to be more or less common across regions that DoE maybe can pay particular attention to. But I just want -- it would be very unfortunate if people saw this as DoE trying to be proscriptive, because we're not.

MR. PARKS: I think another thing, your point is really well made, and sometimes I think I take things for granted, so I don't say enough about some of these things. It's not just about clean generation, and I think it would be a mistake if that's what I left you with, the image I've left you with.

Because what happens on the demand response side, what happens to the efficiency side has to be tied in, and part of what we're looking at when we talk about this substation is how does the distribution side play differently, entirely different than it does today, and how do you make some of the energy efficiency investments perceived as cost-effective enough to move forward?

Because the problem has always been in the space that we've played is the first five ones have a great internal rate of return, and it's the 20th and 25th one that you really get to that becomes tough to figure out in the marketplace. So how do you move that space forward are critical discussions, and I think DoE spends a lot of effort on

energy efficiency, as you've seen in the last few years.

It's kind of funny for me, and just to react, because I was on the original CADER Board, California Alliance for Distributed Energy Resources in the mid '90s, we first talked a lot about that as some of the original things were going on.

So it's kind of interesting to see how it's evolved from that from a personal, and sometimes I think it's just embedded, and I assume that I said it, so thanks for calling me on it.

MR. COWART: Bill, I have a question for you about your statement that it's not -- or David's statement that it's not proscriptive; it's a vision that's got all this stuff in it. I think one question to put to the Department is, to what degree is it ground-proofed? What degree are all these nice ideas being tested or modeled against physical reality, will they work --

MR. PARKS: Well --

MR. COWART: -- or is it just a

bunch of visionary concepts put into a document?

MR. PARKS: Well, we don't really know yet, but let me challenge back that I think we've been at this a while, and if you look at what we put in the '03 vision, it had the beginnings of Smart Grid in it, for example, it had the beginnings of the Phasor effort, the PMU development.

So I think we've got a record, if you look at ten-year chunks, which is hard to do, it kind of scares me to think about that. But we have moved things, but sometimes these things are five- and ten-year chunks. So I think it's crucial that this is -- I'm not saying this is a consensus process, because, personally, I think those fail, the ones that I've been involved in.

So there is some sense of priority station that needs to come out of this in that process, and I think it's important that it's well vetted so that people think they've had the ability to talk about those things. But at the end of the day, certain things will get

emphasized over others, and what you see is that happening within the Department and within the industry anyway.

The question is, can we find those things that are truly common and say no matter what the scenario is in the future, there's a great deal of activities that need to happen, no matter which scenario you pick. And I think sometimes we get caught up in saying, no, my generation favorite is better than yours, or even my market structure is better than yours, and not look at the commonality of things.

And I think one thing we would like to do is emphasize that commonality.

MR. COWART: All right. I see a lot of cards up, and in order, I think Mike is first.

MR. HEYEK: Well, Bill, the tag line I use at the end of my e-mails is "imagination is more important than knowledge" and that's Albert Einstein, and kudos to the DoE and yourself for putting out this vision.

I'm really intrigued by the concept

of the blurring of T&D, it's actually the blurring of everything; supply is blurred, as well, with end use. So the entirety of this is -- and one only sees the leading edge of it, with respect to storage, determining what is it, with respect to GT&D.

But one of the areas that I'd like you to talk about is Power Electronics. I'm not sure the vendors are doing enough in that area, there's much more power in getting Power Electronics to serve a lot of things, including transformation. However, Power Electronics doesn't have a 40- or 50-year life, a lot of Power Electronics we have today only deal, have about a 20 to 25 useful life, and the Power Electronics is very lossy.

The elements in between are very efficient, but the Power Electronics are very lossy. So it's one of the areas of interest for the Transmission Committee that will be talked about tomorrow. The question for you is, what areas specifically in Power Electronics are you going to attack?

MR. PARKS: Well, thank you for

those comments. I want to jump into about four different things. There are some specific things being attacked right now, I think that's the first place to start. If you look at what we're doing and what RVE is doing, in particular, on some of the awards that have been made in the last couple years, that will give an indication of that.

And I think what you're seeing are some things like can you get some switch devices, some platforms, if you will, that can operate at 15 or 20 KV, as an example, and what kind of components come out of that. So I think there's an entire pipeline that's not well-outlined, and I don't think we have yet the answer to your question. I think it's an area that there's a great deal of interest in, but I don't see a clear, well-defined Power Electronics road map that has been put together by anybody, personally.

And I would agree with you that I think all of us, probably collective with the component developers, have not spent enough time thinking about how do we build a critical

mass of this space, because I would say I don't think we have critical mass yet. We have really great projects, but I don't think that's a dedicated, really, campaign at this point.

And I think part of the discussion currently is how does it become more of that. So I think that's a TBD from my standpoint. Now, when I talk about those six areas, they're not all fully-funded, robust areas, and that's probably one of the weakest ones that has the highest thing to offer on the Power Electronics space.

And it's continually being redefined, and redefined by a number of people, so it's hard to give it a single, I'd love to be able to -- like SunShot or like some of the other activities, I'd love to say, in five years, it's going to be this goal in Power Electronics. We don't have that yet.

We have put out some things to test as an idea internally, and some of that discussion has gone forward, but at the end of the day, we don't have a roadmap laid out with

that, and I think recommendations from you would help that.

MR. NEVIUS: Bill, on one of your earlier slides you had a phrase, "operating closer to the edge." I wonder if you could elaborate a little bit of whether you're talking about full utilization of assets, or you're talking about compromise of reliability?

MR. PARKS: That's a really good question, we need to take that out, probably, it scares too many people, including ourselves. We really meant better utilization of assets, primarily. What we still, having said that, we did not mean to challenge, to reduce reliability, but we do think a debate on is the reliability that we've counted on the same reliability that we need in the future needs to occur more robustly.

So I think that there are different aspects there, but we did not mean to put anybody's system at risk in this discussion. The key, I think, is what can we learn about predictive tools or build into operating

systems that allow people more flexibility in asset utilization, key factor.

The reliability issue becomes a little bit, in some of the public meetings, I'm sure you've been in, and I've been in, people have said give me less reliability and charge me less, kind of thing, is one end of the spectrum.

And how do we get a balanced view of what the entire needs are, if I'm really going to continue to electrify all my personal devices, and my power quality needs to go up, what are the requirements, how does that impact my reliability needs. All these questions, I think lots of people have put on the table, and comprehensive solution sets aren't there yet.

MR. NEVIUS: I could just add that the people who say give me lower reliability and charge me less only say that until they have an outage.

MR. PARKS: Or they have their own generators, and they're not thinking about what they actually -- the cost benefit of what

they've bought from Honda. But anyway, agreed.

MS. CRUTCHFIELD: Bill, thank you, a very helpful presentation and a good overview regarding where the Department and the administration want to go with respect to an 80 percent clean energy target by 2035. That goal is about 10 years behind the EU, particularly the UK, some of our other developed countries.

It may be beneficial for the Committee, and I'll yield to the Chairman, at some point for us to hear about how far along some of the countries in the EU are with respect to their goal, and what technologies are prevailing, what really is enabling them to get closer to their clean energy target.

So that's one point. And I know you're --

MR. PARKS: Can I address that, and then cover the second one, or --

MS. CRUTCHFIELD: Well, the second one is an easier one, so the second one is, you had a map up of the RPS, where the states

are in terms of RPS goals --

MR. PARKS: Yes.

MS. CRUTCHFIELD: -- and there's a huge part of the country in the south and central part of the country that still has no goal, so the white states. How was the Department engaging those states and what's your view?

MR. PARKS: The second question is much harder than the first question. The first question, actually, Pat and I met with the EU, the planning group of the EU a few months ago, and I would encourage you to have them come in, they gave a great talk, it was a great, about a four-hour discussion that we had.

And one of the things, there are a lot of similarities in trying to put 42 countries, or whatever, together, and putting 50 states together or 48 contiguous ones together. And so we saw more similarities than we saw differences, but having the actual carbon mandate was a tremendously different driver, and changed the economics of the

situation considerably.

So I think what we kind of agreed mutually was to continue to track each other, because it's probably the best example of what we can benchmark in the world, in a comparative kind of system to system kind of level. And we'll continue to do that. And I think there are great lessons learned, I think, in things like offshore wind that we could benefit from.

Having said that, we kind of think the list of things that we both see as challenges is pretty much the same, and pretty daunting. So I think, again, we have mechanisms through IEA and others where we share lessons learned. And we have things like microgrids and Smart Grid that we have committees on and that kind of thing.

So I think continuing to do that at the pace that the world is moving on is great lessons learns. I think it's equal, and this is something that a lot of people brought up, equally important to recognize that we are in a different situation in the United States, we

are not China and we are not the EU in the sense of our legacy system.

And what we want to do about the best use for the consumer, ultimately, and the use of that legacy system. So I think that's the balance point that needs to occur in that, and I don't think, as you've seen by the lack of a national goal, we are yet in a, have a consensus on what that clean energy future looks like.

So, and I just reflect what I said the last time I was here, if I go back three years, and then three years before that, I probably talked about a different scenario three years ago when I consider nuclear, or where I am on Clean Coal, or what I think about wind, and three years before that, the same thing.

So I think it points to what I've seen, and a lot of others in my situation as we get beyond 30-year careers, here, is you know what, you don't pick one winner, you go with a portfolio approach. And we've really shown that we are really bad at picking single

winners, and I don't suggest that. I mean, having gone through the natural gas boom and bust in the '90s, and a lot of people in this room have, as well.

There are lessons learned that we should be cautious about if we're really going to export L&G, that's a different game than natural gas combined cycles, and we need to understand that, and its complexity before everybody jumps on the same band wagon, in my opinion. So a very complex issue.

And as to the chart, I think there was, I guess a challenge, maybe, push back a little bit on that one. I think we're not going to have much success telling California or Alabama or New York what to do as the federal government, I don't want to sign up for that. What I do want to sign up for is what debates and discussion makes sense within those regional presences.

And I think that's a much healthier way to go forward, and a non-confrontational way to go forward in a space that really hasn't moved much. If I can just go back to

about 15 years ago -- not quite 15 years ago -- I was working with the state of Texas before, it was Governor Bush, and there was a lot of discussion -- and I was working with California at the time, too.

A lot of discussion about do we really have to go to zero nox emissions, for example. Because we were on a technology path to get us to 90 percent reduction in an eight-year period, and we hit that goal. And the first discussion with the air regulators was not good enough, and we're like, we're going to spend, we spent $750 million to get devices down to get 90 percent driven out, and it's not good enough?

And the cost to go from 90 to 100 is astronomical, so why don't we take the 90, and there was some debate about, okay, let's take the 90 to start with kind of thing, and let's talk about the other 10 percent, and we were able to move forward with some things in the distribution generation side, because we were able to reap some consensus.

And those are the kind of things

that I think need to happen to differentiate what is achievable, really. Back of the issue of what is achievable now, and what do we think is something, long term, let's think about the other 10 percent, but let's get the 90 now. And I think there are a lot of cases like that today, I would argue.

Sorry for the long-winded answer. Next?

MS. REDER: Bill, I applaud the effort to get some consensus on the vision and to reach out in a way that really takes in different perspectives. A couple of areas, if you could expand on it for me.

You had a consumer engagement listed as one of the facets; if you could talk a little bit about how you see rolling that aspect in, the criticality of it, that would be useful. And also, how we might leverage the lessons learn from the $4 billion for Smart Grid stimulus money, and the inputs for that into your effort.

MR. PARKS: Let me start -- maybe Hank would want to comment on some of it, too.

The second part of that is, there are several awards in the Smart Grid that looked at the consumer side, and we're tracking those pretty carefully, and he's got a team working on that to say what are the lessons learned from the consumer benefit side of the smart Grid investments. And I'll give him a chance to think about that before I call on him.

Having -- taking it broader to the consumer engagement, I, again, I don't think I need to stand here and tell you the exact path forward. We've had mixed success, both on the Work Force Education issues, which we do have some money in, as well, and in the consumer benefit side in engagement and consistently going forward and getting both Congress and L&B funding that consistently hits that space.

Because there's still discussion about what DoE's role in all this. And I think that we need to broaden that discussion so that there's more of a consensus brought to funding, whether it's at the federal or state levels, and saying this is important for these reasons, and you should think about X, Y or Z,

and make the decisions you make, but make it with this understanding.

I think that kind of ground swell needs to happen first, before we're going to see a consistent view, in my opinion on that.

Hank, anything you would add to that?

MR. KENCHINGTON: On the Smart Grid, the investment grants and the demo projects, what we're actually trying to do is collect the data on the projects, the cost, the benefits, and provide those case studies so that we can encourage greater innovation and positive reinforcement.

I think Joe will be here tomorrow to talk about the consumer benefits and the whole structure of the build impact, the build matrix which basically tells you how many of each type of technology is being deployed and has been deployed. We're about a little over 50 percent now.

And then we'll be starting to talk about the impact that that is, what is the effect of the various technologies and the

configurations and the architectures are having on the overall benefit to the consumer and to the utility. So we hope to document those in a away that's consistent.

If you look at many of the other consumer -- well, not only consumer behaviors to others, but the business case as a whole, provide a basis to better document that consistently across them so we can measure those benefits and compare where it makes sense to deploy what technology where.

I think the Oklahoma Gas and Electric project now has a preliminary report, one that has some very interesting results, I think Joe's going to share those with you tomorrow. But I think that will be a very, this is the first of those studies that we will have produced, and we hope to put out a progress report within the next month that kind of brings everybody up to speed on what's been done so far.

MR. POPOWSKY: Thanks. I just wanted to follow up, I guess, on Dian and Lisa's questions. If you go back to the very

first slides on the vision, the 80 percent clean energy and the -- my question, really was -- well, first of all, you said that that includes Clean Coal. But what do you mean by Clean Coal, then, does that mean carbon sequestration?

MR. PARKS: It does, it's just my antiquated term.

MR. POPOWSKY: Okay.

MR. PARKS: It's sequestration and where that's going, and there are new efforts at the Department to look at that. Having said that, that's complex space, I'm probably not the best spokesperson for that activity.

MR. POPOWSKY: That's okay. Then you go on and say reduction of greenhouse gases of 80 percent, 83 percent by 2050.

MR. PARKS: Right.

MR. POPOWSKY: To the extent -- is that economy-wide or is that electricity, or --

MR. PARKS: Let me clarify this. The left hand box's top three goals, those goals are in the DoE's strategic plan put out

by the administration last year, just to clarify that. So that's the overall energy goals for the nation that are sought.

MR. POPOWSKY: Okay. I just, my only concern is that it's going to be pretty difficult, I guess, to get 83 percent by 2050 because it's one thing if natural gas is included as clean energy, that also impacts the -- in 2035, that would have an impact on how you get down by 83 percent in 2050.

MR. PARKS: Definitely would. I come back to reach the kind of goals of 83 percent reduction by 2050, it's going to take everything that we can think of to develop to really be successful in that space for my people. It's really hard, that's a very large number, I would agree.

So I think it's going to take that portfolio, and we're going to see how things in the short term, like the carbon regulations that are being debated now, and the impact of those, play out in those increments. And part of what we want to think about in implementation is can we holistically think

about, from the electricity sector side, five-year increments that show what is it we actually want to achieve by when.

And then, ultimately, how do they tie to the goals, the overall goals of administrations as we go forward. Did that answer what you needed?

MR. COWART: Well, I guess I'm confused, because I would like to follow up on this. Is the vision, the national vision for the Grid of the future intended, when it's put out there, to be one, to be a vision that could, in fact, meet those goals?

MR. PARKS: Well, I think that's to be determined, right? If we make this a public/private vision that I don't think DoE gets to dictate that answer.

MR. COWART: So the vision, in comparison, for example, to the European road map that you referenced a little while ago, the vision that you're talking about that DoE is working on is more like what we might call a process for a vision --

MR. PARKS: Correct.

MR. COWART: -- as opposed to here's our vision --

MR. PARKS: At the end, what we'd like to see is a public/private statement of here is the ultimate vision, here are actual milestones, here are things that we want to collectively go after and for what reason. And DoE would have a subset of those that may or may not be more aggressive than, say, what the private sector does in comparison.

So, right, again, this is the -- it's a working vision of things, it's not the complete answer, and we're not ready to put a metrics behind everything DoE is doing. Having understood that DoE's metrics internally are focused on achieving those goals of the left at this point.

MR. COWART: David?

MR. MEYER: Yes. This particular discussion, I think, is a good example of the kind of discussion that needs to go on. And, to me, it verifies the value of this approach. This approach is, by definition, we're trying to be holistic, we're trying to get our arms

and minds around this, all of this complexity.

And where there are disconnects, where one point collides with another, we need to know that, we need to figure that, be aware of it and find, come to terms with it. That's the value of this approach. It's not easy, but that's where the value comes from. Not entirely, but what this does is, among other things, it helps us internally.

In the Department, it has helped us understand our priorities, figure out our priorities better. What are the really important things that we need -- we've all got scarce resources, and we've got this huge assignment ahead of us and scarce resources to accomplish it with.

So we better sharpen our thinking quite a bit, with respect to priorities to make sure we're putting our nickels in the right spot at the right time. Anyway, enough of that.

MR. PARKS: I think, simplistically, we're hoping that the sum is greater than any of the parts, right. So what DoE can

contribute is a subset of the totality of what has to happen, here, if we're truly going to hit these kinds of goals, from my viewpoint.

MR. COWART: Does it make sense for the Department to ask this Committee to have a more in-depth conversation or workshop around this vision to give you, to treat this Committee as one of the workshops that's giving you feedback on the different elements?

It sounds like we have a half-hour to discuss really thorny great topics, and then that's, given talent on this Committee and the expertise of the Committee, that seems like a wasted opportunity.

MR. PARKS: Just speaking for me, I think it would be really helpful at least to have that dialogue, because I can see contribution from that happening from what we're trying to achieve. So if this Committee was willing to take that on, I think that would be very helpful.

MR. SLOAN: Following up on a comment that Hank made, where you talked about disseminating the information or the lessons

learned from various stimulus project reports; does that encourage the Department to look carefully at who your target audience is are?

It's one thing to provide a technical summary on OG&E project to Kansas City Power and Light or another utility, that may or may not elicit change or investment, but to have the Department putting those lessons and the benefits into language that you then deliver to the National Governor's Association, or through NARUC Regulatory Community so that the policymakers start to ask their utilities why aren't you doing this, or are you thinking about this?

And I would remind the Department and this Committee of two things, two lessons I learned a long time ago. One, Jules Verne captured the public imagination when he talked about nuclear powered submarines and space travel, and things of that nature. The public then was more willing to accept investments, admittedly many years later, but the imagination had flourished among the general populous.

And the antismoking and seat belt campaigns never took off until the kids would come home and tell mom and dad, you need to go outside and smoke that, or why aren't you buckled up. I'm not sure that we can have the Department elicit 8- to 12-year olds in changing consumer demands, but, to me, it is a lesson in getting messages to the correct audiences in order to elicit behavioral changes. Thank you.

MR. PARKS: Thank you very much for those comments. I will say that, historically, we are pretty bad at that. We're bad at that for a couple reasons: One; a lot of technocrats. And two; really, again, guidance from the Hill have been, stay out of that space, that's not what you do, you're science oriented only. And I think we need to broaden -- actually, the Smart Grid activities and some of the related things have broadened that perspective.

And I think it's something that we need to take advantage of, because I think your message is right on, and I think that's

really helped. And I've seen it in some of the state things that I have personally been involved in, and it's very exciting to see young people stand up and say, you know what, I'm going to go to college, I'm going to come back and make that my mission in life.

And I've actually experienced that, and that is a very, very powerful thing. So I'd love, personally, to see more of that kind of thing.

MR. COWART: Following up on that last comment, I'd like you to go to slide 14. Are your slides all numbered?

MR. PARKS: No, but tell me the subject.

MR. COWART: Well, I only remember part of it, so that's the problem. The slide that referred to consumers. It's okay if you don't find it, I can ask the question anyway.

MR. PARKS: Was this on the left, or?

MR. COWART: No.

MR. PARKS: Okay. Well, then let's just go through and we'll look for --

MR. COWART: It goes through -- oh, they're not all numbered in order.

MR. PARKS: They're not. Is it one of these?

MR. COWART: No. Anyhow, I can ask the question anyway.

MR. PARKS: Okay, ask the question.

MR. COWART: I was surprised that the conversation about Smart Grid and consumers, your bullet points on that, didn't mention, for example, rate design. Some of the policies that would really be needed to be adopted at the state and utility levels, in order to leverage the capabilities of the Smart Grid to deliver all the power system benefits that this vision is aimed at.

So I'm just sort of curious about that. This is, the Department is not -- I know some of the Smart Grid pilots, you are looking at rate design as a component for the consumer interface, including rate design as a component of the pilots. So what are you thinking about that?

MR. PARKS: I'm not entirely sure

how to answer that, because I don't think we have a single DoE focus on the answer. It depends on the area kind of thing. I think some of us have been working with people like NARUC and NGA on -- like Larry Mansueti, some of his work has funded some of those things to look at that. We've done some things with individual states, programs like SunShot and things on the solar in different ways.

I don't think it's a whole, truly orchestrated thing, it's been more technology or single focus kind of implemented than holistic look at that, personally, I think.

MR. COWART: Well, maybe this is something that we can discuss further. But it's, I think, a straightforward observation that the technology of the Smart Meter is useless unless there's a consumer interface that is delivering information to consumers that they can use and act on and are motivated to act on.

And, clearly, that's a part of mobilizing Smart Grid capabilities, and I'm sure that DoE is very sophisticated in

understanding that. So it seems like it ought to be really a part of the vision.

MR. PARKS: There's a -- we think it's crucial. Part of the serious issue is that's at the distribution level, and that's state regulated, right. So the federal government can effectively facilitate discussion on those issues. The federal government has a hard time being, correctly, probably, being heard to say, hey, you should do this to any state. That's not well received in any state forums that I've been in.

So there's a line of how do we facilitate that discussion without being proscriptive or perceived as proscriptive by the states. And, again, advice on that could actually be helpful.

MR. COWART: Thank you --

MR. PARKS: I'm sorry, Hank, did you have a comment?

MR. KENCHINGTON: I think part of the response -- I think that would be a great question for Joe Paladino tomorrow to follow

up with him on that question, because he's handling those reports. But we are, some of the consumer behavior studies are looking at the various rates, along with the consumer behavior and the demographics and the technology, and what is the impact of all those elements on the outcome. So we should have some good results..

MR. MEYER: This particular problem is bigger than it first appears. That is, we've already mentioned that a lot of action that we're interested in is at the intersection and the blurring between the transmission space and the distribution space. However, take note that we're now developing some fairly well-defined institutional mechanisms for doing transmission planning.

Is there anything comparable to that on the distribution side? No. At least in some states there is, but as a general rule, no. And so this transition that we're talking about managing and dealing with this blurring between transmission and distribution is raising a lot of questions that, right now, we

don't have good institutional ways of dealing with.

So it's not just consumer education, it's a much bigger set of things that we have to come to terms with, here.

MR. COWART: Okay. Let me just welcome Pat Hoffman, glad to see you, and I hope the budget is going to work out perfectly. Is there anything you'd like to say at the moment? Okay, thank you. We'll continue with this conversation.

Lisa, do you have a quick comment, because Gordon was next.

MS. CRUTCHFIELD: I just wanted to respond to David's question around coordinating rate design, rate policy to advance Smart Grid. Regulators really do utilize NARUC to share information, and when we get the learnings from the recent Smart Grid pilots, we really need to roll that out to NARUC as quickly as possible.

Regulators like to steal from one another, right? Rich and I, having been regulators. So if there is a rate design that

is an enabler to very quickly deploying technology, I think we can get that message out pretty quickly at NARUC. The other area, the EEI has a rates committee where we share rate policy quite a bit.

And that rates committee, I think, would learn a lot from the evidence from the pilots, so we need to share that, too. So I'm surprised we don't see more of the associations in the audience when this committee takes place, EEI, AGA, the American Gas Association, and NARUC, having some representation and listening to this dialogue.

We talked about this on Wanda's calls. It's important that we get them in the room with us so that they can learn from all the good work that DoE has underway. Thank you.

MR. PARKS: I think those are all really great comments, and I think, as Dave said, it's pretty complicated space. I think, and what I still struggle with, too, is what happens if I list all the things that people want to implement here that impact on the

consumer, and really, how do people start thinking about what is the final price tag, and not just think about an individual hit one at a time, because it's not hitting the market one at a time.

And I think about what are the priorities for that, because I do think controlling the impact on consumers is something that we all have a concern about. Yes, please.

MR. VAN WELIE: Hi, Bill. Could you go back to the, I think it was one of the opening slides where you had the vision up.

MR. PARKS: Yes.

MR. VAN WELIE: The next one. There you go. So when I see that, I can't -- I'm probably being too much of an engineer, here, I admit that up front, but I can't help experience some level of cognitive dissonance, and I wonder if the DoE is not putting too much of a burden on itself.

Because you sort of, you've cast those goals as being your goals, when, really, they ought to be the country's goals. Because

you don't hold the purse strings that are going to make this happen --

MR. PARKS: Right.

MR. VAN WELIE: -- you can't build the infrastructure, and so forth.

MR. PARKS: Right.

MR. VAN WELIE: I think the DoE has a unique vantage point in the sense that you get the bird's eye view of what's happening across the country, and you have, and you're involved in many different activities. And I think you can be the scorekeeper, you can put up the report card and you can be the scorekeeper.

But I wonder if you're not sort of setting yourself up by saying these are the DoE's goals when you don't have the means by which to actually achieve them. I think the rest of the presentation can be consistent with what you've said, which is, this is a public/private vision. I suspect the reality is you're going to have some in the private sector and the public sector, as well, that agree with you, and there will be others that

do not.

And the speed of the evolution is going to ultimately be dictated by what's happening out there in the states, so it would be nice to sort of have the vision stay consistent, even if the dates turn out to be different, if you know what I mean by that. So if it was teed up as here's a vision for the country in order to achieve a certain objective.

Which is, let's say, a certain level of CO2 emissions by a certain date, and then there's a whole bunch of things that need to be done, amongst which will be Congress might have to act on renewable energy standard, or CO2 tax, or something, and states are going to have to play their part, and here's DoE's role in all of that, which is to get involved in the following array of different activities in order to act as an enabler.

Anyway, just a thought, because by sort of putting up the goals as by 2035, 80 percent as DoE's energy goals, do you sort of make yourself a lightning rod for those who

wish to dispute that that's realistic or that that's not your role, et cetera?

MR. PARKS: That's actually a really great point. And, clearly, in this discussion, we've not -- I haven't differentiated well enough, so let me try that again. When we've been talking about the vision that we had, the words we have, that started as an internal discussion, we acknowledged that.

And part of the reason that we've been going through this process of getting stakeholders is how do we get it to be a national one? And if you go to the red lines at the bottom, that will help us understand our part of that. But the majority of investment that's going to change the Grid in the future isn't going to come from DoE.

We would totally agree with that. We hope to facilitate, we see that as our role, whether it kind of fits across our mission very much. But is DoE going to achieve those goals for the nation? The answer is no, we're not. There's no way that

we see that happening in the structure that we're in.

When we talk about these goals on the left-hand side, I'm reporting those as that's the DoE's strategic plan as existed that came out last year. That doesn't say that this national public/private vision, that those are the goals of it. There are no goals that have been laid out for that yet.

And part of what we want the dialogue to do is to say, are those the kind of goals that we have, or do we have goals that are actually subsets of things, because we can't agree on a national energy plan. This is not creating a national energy plan, that's been tried a lot, and so far, we don't have one. So I don't want to confuse things, this is from the DoE's strategic plan.

But I don't think it should limit what the nation thinks about, nor should it create barriers to what the nation thinks about holistically, because DoE's only a subset of that. Does that make sense?

MR. VAN WELIE: Yeah. The problem

is, you're going get people like me who look at that and say how do you, how are you going to achieve that, what's your plan for achieving it. And then the answer, I think, quite rightly, is, well, we can't achieve that on our own, everybody has to pull together to make something like that happen.

And then you sort of get sucked into a huge debate over, well, who's going to do that, and so forth. So if one were to tee it up, I think the general consensus out there that we have to move towards cleaner energy, I think that's almost a bipartisan view, it's the details where people are arguing.

So I think the subtext, the 2035, 80 percent, the one million by 2015 and so forth, if one were to lay out a road map to say if we want to achieve a specific objective by 2020, I think those goals are valid. If it was 2050 or 2060 or 2070, those things might change a little. So I guess what I'm suggesting is that the vision be date-flexible.

One could set out a goal to say if you want to achieve it, country, by such and

such a date, here are the things one needs to do, and we've got to work together in order to achieve that goal, as opposed to sort of making it appear as if these are your goals that you're imposing on the industry.

That's really the sense that the slide gives me. And I know that's not your intention.

MR. PARKS: No, it's not, so we need to work on how we message that better. Those are really good comments. I do think, and I think we're in agreement, generally, we do need goals, and we need milestones to measure ourselves against. So how we create those things and at the same time not turn off people by setting up something that gets a kind of reaction that so mixed that you can't get any progress.

So walking that line becomes very important. And, again, something back to David's point that maybe you guys could help us explain this a little better.

MS. GRUENEICH: I think that there's a tension that you really haven't addressed or

resolved, and that is, is it top down or bottom up? And my concern that I raise is, I think that there's a lot of valuable work that's going into this, the stimulus money, and all the events that are coming out of that is hugely important.

And I personally would like not to have this become a political football that gets everybody antagonized about it. And the reality is, I'll be blunt, DoE does not have jurisdiction to implement probably 99 percent of what's in here. And after the stimulus money goes away, which it is, it's not even going to have the money side to push it.

So, to me, I would personally stay away from words like plan, implementation, things that many people, I think, will perceive that this is top down from DoE telling people this is the world and now we're going to help you or we're going tell you how to achieve it. Especially because, getting back to my prior point, I mean, I fundamentally agree with every goal up there, but what does the plan look like?

Does it look like each state is achieving that, does it look like the country is? And if the country is doing it, then sooner or later, you have to decide, well, what is each state doing. So I think, really, the value that is desperately needed is to have some good information on the vision for those parts of the states, or those parts of the currently that will embrace this vision.

What does it look like, what do you have to do? I mean, how are you going to have to think about changing your substations, how are you going to have to have these grids operate? And to, in some way, not say this is the plan for the entire grid in the entire country, but as we're moving towards this, these are the types of things that we've got to address.

And I'll just end with one other part that I've, for several years, thought would be very important; what is the role of DoE moving forward in this, that for those of us out in the states, except for -- I always had this vision wouldn't it be great if DoE

could go back to what it had many, many years ago where they actually had technical assistance, regional areas.

Which I think is going become, frankly, very critical if we're looking at making some fundamental changes, especially as we start to get down into the distribution level where that's really giving technical assistance, it's not telling people what to do, but you've got people around who can help out.

So maybe you can think about what would be the DoE role going forward to help achieve it, and have some discussion of that in this vision or plan.

MR. PARKS: We have more agreement than disagreement in this discussion, that's part of why this discussion is really helpful, and we should figure out ways to continue this. One thing that we said before was, and I'm not sure you were there, Dian, but part of why we want to look at this kind of space is to look at that traditional boundary of federal and state as an example and say, is

that boundary still the boundary that it was, or has that boundary been moved in some ways.

Has it moved to a regional issue, for example. And if it's a regional issue, you know, constitutionally, regional issues don't have the foundation there if it's federal or state. So how do we deal with that in a constructive way than the way things, like the interconnection has started to do. California alone can make decisions about some things, there's some things it can't make decisions for its neighbors on, in terms of the transmission lines, as you well know, those kinds of things.

So how do we help, as a federal side, facilitate some of that, especially when you need some things like federal permits or federal activities. How does all that happen in a constructive way and not a way that just slows things down. Those are the kind of debates that I think we want to happen in all this and say, okay, this state has a legitimate view, this state, this region has a legitimate view, the federal view has a

legitimate aspect to it.

How do we put that together in a way and move this ball in a way that's maybe not moving so well right now. If we truly want to, say, who -- I mean, honest debates. Who wants to buy Midwest Wind, who wants to buy it? And let's find a buyer and let's set the deal up and make it happen if there's an a buyer for this. Let's not push one thing, or a different set of things on to people that don't necessarily want it.

So what are the answers? And I don't think you're going to get a single, national answer, and I think what we need to do is create a structure that says that's okay, we want to move the ball in California and we want to move the ball in the Southeast, and we want to move it in the Northeast or the Northwest, and how do we do it?

And the answer set is probably not the same, given the legacies that we have, given the constituents that are there, given the activities. If we really want to move the ball forward, I'll take regional activities in

the Southeast, and I'll take regional activities in the Southwest and still have progress towards the whole thing. And that progress probably looks different, and I really think that's critical to talk about.

I do get concerned in the couple of decades that I've worked with PUC commissioners on the turnover that happens there as bad as the turnover on our side, maybe worse. I think Chuck said 2.2 average year life right now. That's a huge consideration for the kind of decisions that are being put in front of commissioners. I feel, frankly, for them, because it's not just electricity issue, it's all the other issues that they have to deal with at the same time.

And how to make rational, within-context decisions on that, it becomes very important. Especially, again, as we start to think about what are the regional solution sets. And part of that is really what we want to tackle here, how can we start to create this dialogue about how those regional entities play.

And we've had discussions about, okay, we had regional offices, they were really, they were different than, I think, if you were to think about regional offices today, what they would look like. Those were grant application offices a lot, and they did provide some technical assistance. We were heavily involved in a lot of that, some of us, Pat and I.

Do we need a different kind of regional structure than we have today? I think all are fair-game questions that need to happen in the debate. Thank you.

MR. COWART: Tom?

MR. SLOAN: Thank you. Building on the last set of comments, and having Cheryl here brings to the point that if the DoE and the FERC and the RTO/ISO groups can focus on blind losses and other technology-driven issues, those will save the consumers money. The consumer may not see it, but certainly allows them state commissions or utilities or the DoE to push for the consumer interactions which have costs.

And maybe there's a way to sort of manage those costs by managing the front end, which involves more of the infrastructure, the federal agencies and the regional organizations and such. And I don't expect that most of my constituents are going to immediately embrace the idea of managing their electric use on an hour by hour basis.

I mean, they can't even program their thermostats today, and I can't, either. I still can't get the blinking light on the VCR to stop blinking. So will it come? Yes, my grandchildren will do it. But in the interim, I think it behooves us more to focus on the big players and how we stimulate the investment to manage the system better.

MR. WEEDALL: I just want to make sure that we keep an important audience out there identified. I know we've been dancing around it, but I think it's real important to go beyond the regulators, but to really reach out to the utilities directly. A lot of companies are reinventing themselves today in anticipation of the future.

And we should be understanding and incorporating the work that you're laying out, Bill, DoE's laying out in making sure that, as they go through that transition, that they've got this right at the core.

MR. PARKS: When I was working with Hawaii, we said we wanted three things in balance; we wanted a healthy utility structure, financially healthy everything we wanted to protect consumer interest; and we wanted to open the market to new technology solution sets. And we want those three things in balance.

I think it's really important to consider that, so I don't know what the utility future business model really looks like, but I think it's really important that people think about what that is, starting with those utilities themselves, or the companies that they become.

And I think, if you look at the telecommunications world, some of those companies have totally reinvented themselves. I mean, one of the companies said we've

changed 93 percent of our business model in five years, kind of thing. That's kind of scary to anybody, especially in a regulated business world.

But the point is, looking at new business models and consideration for those kind of things are things that need to happen. Doesn't mean DoE needs to tell anybody anything, but knowing that it's being looked at and stimulating that discussion, I think, is very important for it to move forward faster. Which, in the end, I think is in the consumer's interest, personally.

MS. LA FLEUR: Thank you. I just want to pick up on Gordon and Dian's comments about, because there's a lot of value in this vision that's not necessarily tied to acceptance of the 80 percent clean energy standard. And based on my peregrinations, I spent a really interesting evening at the US Chamber of Commerce, I would say there's probably not unanimous consensus that we're working toward it.

But the set of charts you have with

all the states and the different maps really demonstrate what we all know that we're really operating in a very complex ecosystem with a lot of different decision makers. But there are a large number of initiatives happening that I think DoE, and DoE's vision could be a facilitator of.

We have 29 states with renewable portfolio standards. I don't know the number of states that are doing Smart Grid at the distribution level, but I suspect it's a rather large number, based on what I hear anecdotally. Between the 29 states with renewable portfolio standards, which is most of the populous states, the most populous states in the country, the changes in the gas market and the EPA, we're seeing a sea change in power supply.

And, hopefully, partly through Order 1000, we'll have all of the country doing regional transmission planning, on which two-thirds are already doing in the ISOs. So there's an awful lot of energy going into some efforts, even though they're not all

coordinated in the seamless integration to move energy power supply in a different direction.

And I think, even without premising it on the percent clean energy standard, or the 83 percent carbon reduction, the work that DoE has put forward in these charts is really a facilitator of a lot of that. So I try in my talks to sort of say we're trying to facilitate everything that's going on at the state level.

It can't happen without all the nitty-gritty work that FERC has to do to determine how all those renewables are going to be integrated in the grid, and so forth. And I was going to start with this, but one my biggest frustrations when I make a speech and then somebody says in the audience, they're so frustrated there's no federal energy policy, I think what is my job, what am I doing, what is my life even about.

So I just would encourage you to think about the extent to which a lot of this is self-standing to facilitate other things,

even without being tied to what we might all think are the worthwhile, but not everyone thinks are worthwhile, mega goals, is, I guess, my comment.

MR. PARKS: Thank you for the comment.

MR. VAN WELIE: I'd like to build on that.

MR. PARKS: Okay.

MR. VAN WELIE: I was sitting here thinking about how does, how could DoE create a vision that is, that can survive multiple administrations and multiple changes in Congress. Because most people would say they're frustrated because we never have any energy policy, et cetera. So you've laid out a vision, and I agree with Commissioner La Fleur, I think there's a lot of good work in here in terms of sort of laying out architecturally how things could look, as we evolve towards a clean energy future.

So you wouldn't want all of that to be thrown out just because some of you are going to disagree with you four years or five

years or 12 years from now, with respect to the specific goals that have been set. And if one had to have this be sort of an architectural vision and one could create some consistency in the discussion across the country, I think you're going a lot of good in terms of starting to create some energy policy, even though people might not want to call it that.

MR. PARKS: I think that we would agree with that goal, Gordon, that was pretty well stated. Doing this, we would like it to have a life beyond now. I think, we did our first vision in 2003, it had about a ten-year life span, maybe eight years, real constructive, but it changed a lot of, it set the stage for a lot of debate.

Whether we did it or not, what FERC's done came out of some of those discussions that we had early on with Pat and Allison when they were there, and that kind of thing. So as an example of that, and if you look at what FERC and others have done, there is transportation that happens, again, from my

decades-long perspective kind of thing.

So how can we create a dialogue that has that kind of consistency, I think is really important. And we should continue to figure out how to move that forward so that, in my experience, you're going to see times when the federal may lead and they may lag, and if we can create a conversation and an infrastructure collectively that when one member does lead or lag, another member picks that up and handles their part of it.

Because, in the end, it is a campaign, and there are thousands of actions that have to happen. So if we can just somehow create something that says we need to move this entire front. And sometimes, these ten things are going to move, or these hundred things are going to move, and other times, just single thing really will make a difference.

But it that constant collective awareness of that, I think, is where we failed in the past to achieve, and it's created probably a lot more expense in the end than

really needed to happen.

MR. COWART: I'm finding this conversation really fascinating and more wonderful than I thought it was going to be. Because of all these different comments urging you on the one hand to -- and this is what I'm sensing the Committing is kind of advising -- to not lead with these precise goals, national broad goals, because they're not really necessary as the underpinning for the document.

And, however, the direction is essential. So this clear statement of direction is more important than the clear statement of dates and percentages. I mean, that seems to be a pretty clear message you're getting.

MR. PARKS: Okay.

MR. COWART: And on the other hand, I'm going to, I've also heard, and would repeat the message that says it's got to be about more than technology. You put up a big triangle at the beginning that says markets, policies and technology.

MR. PARKS: Right.

MR. COWART: And a lot of the tendency in these kind of documents is to focus on the technologies and less on the necessary complements in terms of market, innovations in market design and innovations in other related policies when we discussed consumer behaviors, rate design, what have you.

And I would say that, just as with the technologies, which are not within the jurisdiction of DoE or FERC, for that matter, in many of these instances, the policies are outside the jurisdiction of DoE and FERC lie with the states. That's okay. To include as complements to the technologies that's part of the vision.

So I would encourage not shying away from policies that complement Smart Grids or actually make Smart Grids possible, make it possible for Smart Grids to actually achieve smart results, just because they're state jurisdictional.

MR. PARKS: Okay, thank you.

MR. COWART: And now, returning to our list of comments from Jose and then Mike.

MR. DELGADO: Bill, I don't want to add to the confusion. I would like to, in fact, kind of --

MR. PARKS: Sure you do.

MR. DELGADO: In a wicked way, I do. Maybe I'm paraphrasing a little bit what Cheryl said, but it goes this way. As I listen to this, it reminds me of what this, if we're going to call the Smart Grid a supper of very confusing and multiple claims. The question is; is it supposed to give us energy savings? Is it supposed to be bringing lower prices? Is it supposed to clean the air from carbon? Is it supposed to -- because I have heard claims in every direction.

And when you get those multiple claims, including the goals that you have in there, that's too much to put in one set of technology, it becomes very, very difficult. I feel strongly that what this technology, if we're going to talk about technology, which is not just technology, and I agree that it has

to do with the complete package of regulation, something that, in fact, works together.

What it needs is a very strong successful example that can focus on one particular goal, okay, and a very specific location. And I'm going to say it is likely to be a different goal in different places. Where you have extremely high energy cost, it's going to be energy costs. Where, in fact, you have a problem with reliability, it's likely to become that.

When you have the ability to bring a lot of solar wind and other, then integration of that could, in fact, become the goal of it. The question is, it becomes very difficult to talk about it when you try to talk about it nationally. Because, in fact, I believe that we need an application that works and that solves one problem locally.

And even though it appears everybody -- I know, for example, we all have smart meters, because it simplifies meter reading. By itself, it's a great application, it justifies itself. And personal cost. Too bad

that it reduces employment, but it does. So there is a target. The question is; what else can it do?

And in different places, it's likely to be different things. But we have to come to a point that we can illustrate an example where locally it has solved something significant. Because it keeps promising what it cannot deliver, because it's too many promises.

MR. PARKS: Thank you for the comments. I think there are a couple issues to pull from what you said. The first is, the Smart Grid definition is not universal, right? I mean, we've had our set that we've used, but people have used it broadly to mean many, many things, just as -- and I think we could easily fall into a similar trap, here.

I think we've shown historically that specific demonstrations of things do move the ball and can move the ball and make it happen. And I think that should be something that happens, here. What I would not want to lose are the potential synergies between the

areas.

For example, let me take one of the exams that you put forward. If I only concentrated on renewables integration, I may not get the benefit of Power Electronics or advanced modeling that could lead to solution sets that are specific demonstrations of things that do move the ball, and can move the ball and make it happen. And I think that should be something that happens, here. What I would not want to lose are the potential synergies between areas.

For example, let me take one of the examples you put forward; if I only concentrated on renewables integration, I may not get the benefit of Power Electronics or advanced modeling that could lead to solution sets that are better solution sets than if I narrowly hit the big topic of renewable integration.

So a balance needs to occur there, I think, saying what are the specific short-term deliverables and things we want to demonstrate, and let's make sure we

characterize them within a bigger frame work and say how could they lead to this or that. And some things like this hub really ought to leap out there and say what of these can we put together in this. Because we know we've got this problem with integration, we've got this issue specifically with PV, we've got this thing coming out of the Power Electronics, let's put the first one out there and how do we blend those. So I think we need some leapfrog things embedded in that.

But you put all that together, that becomes kind of a public/private roadmap or set of activities that we do, I think. And that's how I would view.

MR. DELGADO: Just a follow-up. My concern with that approach is that it continues to be a public confuser.

MR. PARKS: It could certainly --

MR. DELGADO: And it's also an industry confuser. When this term was first used, we used to have great battles with EPRI, because what is it you're talking about, and they could never put their finger on it.

MR. PARKS: Right.

MR. DELGADO: But it was a great marketing label, but you couldn't put your finger on it, and we used to have debates over it. But the question is, we still cannot put our finger on it, and you say we don't want to limit what it can do.

And it's exactly that that I think is limiting, the deployment of the technologies and the systems, because we have not focused on one thing. Others may come, others will come, but unless you can demonstrate that it addresses an issue locally someplace in a very good way, I think you're going to have the problem of vagueness. And vagueness is deadly.

MR. PARKS: Point well made. And I think, without specific targets and things shown, we will fail in this activity, so we need to figure out how to do that. How they collectively go together if there's a set of activities, we could debate that. It gets a little bit to the earlier discussion about is this top down or bottom up kind of thing.

But the end of the day, if we could move 10 or subjects meaningfully, that will impact the national direction. But I would agree, we need specific events to occur, demonstrations to occur, activities to occur, and get very specific on those. Otherwise, we talk for a long, long time.

MS. HOFFMAN: I guess, Jose, we could spend a lot of time debating the Smart Grid, but it's already out there, it's already moving, so the question is are we getting the value of it that we asked for. I think there is value coming out of it based on the examples. You could take Southern company that's looking at the meteoric data that can map out the tornadoes that have gone by, looked at prepositioning equipment, reduction in salient safety numbers, they're also looking at developing a new outage management system that's built off of some of the data that's coming in. So there are examples out there.

Are they ubiquitous across the United States? No, because it's probably

being tailored depending on how the utility's business model is and how it's growing. So if we're not effective enough in getting that information across, that's one thing, but I believe, if you take many different examples of the funding that has been deployed, it shows exactly how the utilities are fitting that technology and creating some innovative solutions within their boundaries. Some of them are even being very proactive in how the sustainable, how a county or a city is looking at improving the quality of life across the community.

MR. DELGADO: I appreciate that. If I may add, this is exactly what I say has to happen. That, in fact, those big goals that we have that are nationwide may not be what justifies the technology. The technology may be identified in a certain area because we need a way of identifying where the tornadoes have been, and this thing does it, and that justifies it.

And not only justifies it, it opens the platform for other things that can be

done. But, in fact, that's what is going to do it there. And the different places are going to be the high cost of energy, or the problem with reliability. The point I'm making is that, as long as we keep promising a lot that appears to be generically many things.

We're not identifying that the technology has been applied successfully and very smartly in many different places, and that the platform for future things is being created. My concern is that that is not identified clearly. Maybe the companies do identify it to make it public, but it's not highlighted in a national way.

I think it should be highlighted so that we can see that the technology works in different creative ways, unexpected. You have to tell me that meteorology was not intended, but, in fact, it's working.

MR. PARKS: Okay.

MR. HEYEK: When I started the conversation after Bill did his presentation, I said imagination is more important than

knowledge. And this is a lot of examples of it, because -- and I'm not trying to debate the meaning, what I'm saying is that we kind of get ourselves locked into what's now and what's two years from now.

But if you peel the onion back and look at what ARPA-E is doing, if amount of R&D back there behind the ARPA-E project is extraordinary. We're still building transformers by hand, like they did when Tesla invented it. So those are the types of things that Bill and his team are going to -- I'm sorry, David, I know you and Tesla were like that -- but if you take a look at what ARPA-E and creating a new transformer with Power Electronics, those are the types of things that are out there.

Who knew what gas was going to do today? Who knew that? When we started to space program, they didn't even know what the rocket pushed against in the vacuum of space. Well, who knew that? So I'm okay with the chaos, but I think you're exactly right, everyone's exactly right that we can have this

top down goals with metrics and years and things.

But, again, if Bill, we go out to have a beer together and talk about the ARPA-E projects, those would be really exciting, and I think it might be good to talk about those. The Smart Wire is one of the projects, and some of the other things, the transformer without the transformer is another, and another game changer would be a DC circuit breaker.

As soon as we have a DC circuit breaker, DC networks could become ubiquitous, which they're not today. But the last point I want to make is, we need to pursue those areas, and it may be a little chaotic, but we need to pursue those areas. Because, right now, I don't believe we're the leader in the world in these areas.

And some of these areas are going to be challenging, but I do believe, if you look at the ARPA- E projects, there is a wealth of information that could be game changers, and we can be the leader in the world.

MR. PARKS: Thank you for those comments. I think, clearly, from all of this, it's as complex as we've all stated it is, so this kind of discussion should continue, from my viewpoint. It would be helpful to us as we continue to pull this into what are we actually going to do from DoE and what are we going to do the develop this public/private vision.

MR. COWART: All right. Am I hearing from the Committee further feedback from the Department on the results of the ARPA-E projects, the specific results that we're starting to -- I'm seeing heads nodding, so we can put that on our list for future meetings.

Bill, thank you for your endurance, here.

MR. PARKS: Thanks, everybody, for listening.

MR. COWART: Next up, I think, is Wanda on Work Force Development.

MR. MEYER: Do you want to take a break?

MR. COWART: You want to take a break? All right, a great time for a break. Thank you so much for that suggestion. Come back at a quarter after.

(Recess)

MR. COWART: I just wanted to acknowledge that Wanda has been elevated to IEEE fellow, which is an extraordinary event. It was just announced, I think, last week, so congratulations for Work Force Development. As noted earlier, Pat Hoffman has been able to join us, and I think she has some comments.

MS. HOFFMAN: I don't have a lot of comments. First of all, thank you, everyone, for attending today, and thank you for your participation in the Advisory Committee.

I wanted to let you know that we did, I believe -- David, did we hand out the -- we spent a little bit of time working through all the recommendations from 2011 for the Advisory Committee and provided a response to the Committee on some of those recommendations.

One of the things that we can take a

look at is follow up on specific areas. I know that security's still an important topic and we'll have a brief introduction tomorrow on that. But there are very specific things that I think we need to be able to talk about in more detail as part of this Committee, and I am more than willing to do so, because, as we said, we need to drive down on some issues and really figure out how to push some issues hard forward.

So I'd like you all to, when you have a chance to take a look at that, if there's any further topics that you want to dive into more details, please let us know, and we will pull that back up on the agenda. Other than that, thank you very much for attending, I appreciate it, and I look forward to spending the rest of the evening and tomorrow with you all.

MR. COWART: Thank you. Wanda?

MS. REDER: I appreciate the opportunity to talk a bit about Work Force Development, and I also appreciate the opportunity to do it after Bill got done with

discussing the vision of the Grid.

I think there were some comments in our last discussion that really certainly put out there some fuel for thinking, and that is; do we have the talent in place to truly be a leader? Do we have the talent or are we underway in developing talent in order to fulfill the vision for the Grid? Do we even know?

So these are some of the things that I want to explore with you for a little bit as we go through this. Fundamentally, what I am suggesting is that we create an ad hoc committee that is temporary in nature, that looks at a set of changing landscape to actually put forth some recommendations to get after this Work Force situation.

And I'll go through a little bit of context and history some of the things that have changed recently, because I fully recognize that many of you have been involved in this topic, and certainly supportive over the years. But I think that it's important to understand how there's been a change over the

last few years, and perhaps some implications as a result.

About five years ago, the National Science Foundation worked with the Power and Energy Society and others to do a workshop that resulted in a whole host of recommendations. And at that point in time, Center for Energy Work Force Development was forecasting that about 50 percent of our work force in the power and energy space was forecasted to attrite or leave the industry in a five-year period.

And, actually, over the last few years, we've been, that number's been creeping up a little bit over and over and over again. So that really was the call to action; do we have enough pipeline in place in anticipation of a lot of people leaving? And I think we're all familiar that we've got increasing demand, infrastructure is aging, meanwhile, we have been and continue to see a lot of people that could leave as a result of the demographics that we have.

Also, of course, with the

modernization aspects and digital economy, the work force readiness and preparedness factor has been kind of an ongoing concern. In fact, actually, I think it's been interesting to see how FERC's come out and boldly stated time and time again in the long term reliability assessments that reliability could actually be at stake because of the competencies and wherewithal in place from a work force perspective.

So that's all true. That resulted in a report that was published in April of 2009, several of you were involved in coming up with this recommendations. At that point, we were forecasting that we needed to double the rate of pipeline in anticipation of this attrition challenge that was forecasted.

And in doing so, there were six fundamental recommendations that came out of that, three of which were focused on scholarships and internships to attract the brightest and best students that are already finding their way into the technical engineering space, and the other three were

focused around the education infrastructure, i.e., recognizing that the demographics of those that are teaching are also skewing, and they are looking at retiring.

There's also a direct correlation to research, and the folks that are both teaching and also the students. And the last one was creating centers of excellence so that we could target research dollars and get more concentration. So, in April of 2009, this report came out, it certainly contributed to the stimulus dollars that went into the Smart Grid education effort, $100 million of the stimulus went towards education.

The Power and Energy Society went off and did a scholarship/internship program where we're continuing to look for private sector funding in order attract students into this domain. So we have made a lot of headway, there's a lot of different initiatives that have taken off from this work that was five years ago, but yet we step back and think, wow, there's a lot of emerging issues, as well, and are we really getting

after the education, the skill set, the development, both in the existing work force and in the emerging work force in order to get after this new set of challenges.

Interoperability, cyber security, grid reliability as we increase complexity, all of the data and monitoring, Phasor Measurement Units and the implications around how we use that information, bidirectional, multidirectional power flow on the distribution side, we talked about the DC and distribution, power electronics, the list goes on, on and on and on.

So I think, really, the question is, what's the recognition as this landscape changes and how are we looping that back into the work force that we're developing now, are we developing the work force in order to truly position us as leaders in this space?

So a little bit more about how the landscape has changed in the last five years. The economy, it was a surprise, right? So many people that we thought would be retiring five years ago have not, and they continue to

delay to retirement, and probably will do so until the 401k's come up. So this forecast of 50 percent leaving the industry in five years, actually, the Center for Work Force Development just came out with a 2011 survey, and there were some interesting stats in there.

Not necessarily surprising, but interesting. Where we thought that the number of jobs could actually double, and that pushed on the pipeline requirements, what has actually happened in the industry work force, and this is half of the utility, electric and gas employees that this survey is done on, the industry work force has actually decreased by 11,000 jobs since 2009.

The average age for work force continues to increase a little bit. Again, because a lot of people are delaying retirement, we're not necessarily bringing incumbents in. Employees of age 53 and above have increased five percent by 2006, and employees of 30-plus years of service have also increased. Not surprising, right?

So, in some ways, the question may be, do we really have a problem, and in other ways, I think this is a camouflage scenario where we're building a tsunami and it's not very transparent. Jobs that were anticipated have not incrementally been added, in part due to economic situation. So bringing people in and retaining them in this environment is a little bit of a charge when the new jobs necessarily have not been there.

We are, on the other hand, seeing new applicants come in, but in some cases, especially in the craft side, they don't necessarily meet pre-employment requirements, drug screening and background checks, ability to do math, that kind of thing. The other phenomenon that is pretty Pre-D dominant is that there's more and more out sourcing occurring rather than doing work in utilities.

So, understanding that balance of where work is being performed is also an element, here, but I don't know we've done a very good job of quantifying. As we flip gears and look on the education side, we know

that the power engineering academic community is also a demographic that is aging, and we need to be concerned about that retirement phenomenon, as well.

Meanwhile, those that are teaching are seeing emergent student interest in green jobs, and definitely a passion for areas where there's large societal impact. We have had a lot of launches, i.e., scholarship, internship, career awareness, new survey information. I think the question is, are those connected well enough, are we sharing the information in order to maximize the whole.

And then, of course, this competency requirement for the emerging areas, cyber security being one, but there is a whole host of others that I showed earlier. And as you think about the education piece, are we connecting that back into curriculum well enough?

Maybe, maybe not. And what should we be doing in order to make sure that that curriculum is being prepared to launch us into

the future, as compared to teaching for what we've done in the past. There have also been some efforts along the lines of Centers for Excellence, but are we using that in a way that actually bolsters this topic.

So those are a few moving pieces that have all come up in the last five years since that early work was done, and I think it really sets the stage for a few questions. One is; what are the impacts to all of this changing landscape? There's no doubt some. Should we be making course corrections? Maybe there isn't as much angst about the work force and reliability as there was five years ago.

On the other hand, if we peel back the layers of the onion and we start looking at what we really have here, perhaps there would be more.

So I think that revisiting those past recommendations is probably a critical thing to do. And also, the new programs that we've launched, are they connected, are they working, are we leveraging them to the maximum potential.

This last piece, the pipeline development, it takes a long time to build a pipeline, so many times we get pretty shortsighted on some of the things that we do, but is the pipeline adequate if we go back and reassess what the likely attrition rates will be in lieu of people holding on in the work force longer than what we thought. They will retire, it's just a matter of when.

And then, of course, should we be bringing all of that together in some type of collaborative plan or collaborative efforts to maximize effectiveness. So, fundamentally, that's the background. I'm really looking forward to dialogue from this group on if you think we should be focusing on this. If so, to what extent.

This is a proposal to bring together, not only EAC members, but also experts that have background in this area so that we can take a fresh look in lieu of some of the changing landscape issues, and provide some recommendations on how to go forward. I think that some of the framework that we

should be asking questions around are the reliability threats and other risks that are emerging. What should DoE's role be in this?

It's often that you hear Department of Labor, Department of Education, National Science Foundation, and obviously, if reliability is of critical concern, DoE needs to be at the table, but in what role, and how are all of those facets and others pulled together? Perhaps there's out-of-box thinking that should be brought to the table on building career awareness.

We talked about the changes for education, and then, of course, overall assessment on the dynamics and recommendations, and perhaps a coordinated plan. So those are my comments, and I look forward to your thoughts.

MR. COWART: I thought when you got to your bulletin steps, you were going to suggest some.

MS. REDER: Well, yeah, the next steps actually go back to getting an ad hoc committee put together, and that would consist

of not only EAC people, but also folks probably from the National Science Foundation, and other constituencies that have interest.

I think, from there, we need to do a quick assessment on what's out there and figure out, there are a lot of initiatives and programs that have been put in place, it's not always obvious where they are and what's underway. There's been talk about doing another Work Force workshop like we did before with the National Science Foundation as a venue in order to bring these materials together.

And then I think we can springboard off the Center for Energy Work Force Development efforts and their assessment, and also use some survey work that's emerging to help us reassess what the attrition rates are. Another piece, of course, is the education recommendations that would be required in order to get at some of the most critical aspects of the changing elements, cyber security interoperability, for one.

MR. WEEDALL: Wanda, I couldn't

agree more that this is timely, and I really think the analogy you made about a building tsunami is exactly right. You know, I just left the Bonneville during my ten years as Vice President, we had 70 percent of the department retire, so we had our pig in the python. And one of the things I also would encourage you to put up as a justification is losing that institutional knowledge is just very difficult. You can bring a lot of bright young people in, but when they don't have the long suit of experience that many of our senior staff did, it's very difficult.

One other thing is, we anticipated this a number of years ago, and in the Northwest, we did put together an effort with schools to start to develop some of that. So when you're looking for some resources, at least on the green side, I'd be happy to share what we did up in the Northwest.

MS. REDER: Excellent, thanks.

MS. HOFFMAN: I actually think it's a wonderful idea. I have a couple of recommendations here. I know you mentioned

NSF, the Department of Labor, the Department of Education, and including DoE's Work Force training grounds, what we could do is spend a little bit of time bringing some of those folks in at one of the EAC meetings to go over some of the activities and the strategies that each of the agencies have in their path forward so we actually can provide some feedback to the relevant folks, but also provide some insight from the Work Force grants that we already have underway.

Some of the things that I identify found successful as I went around is having some of the graduate students talk and go to the high schools to encourage some of the high school students to get in a career in this field. We talked about it, and I told folks in a joking fashion that I said I'm too old to talk to the kids nowadays.

They want to hear from the graduate students that turn around and say, hey, listen, this is an exciting field, and those student groups, I think, are very passionate to raising awareness and getting folks

involved, so how do you encourage that? I think the partnerships between the utilities and the universities and the community college has to be a part of this as we look forward.

And I know that puts a little bit more pressure on utilities, but building that community relationship is a way to get some successes out there. The other thing that we have to work out is research programs. If we're going to build the centers of excellence and the capabilities, there has to be a partnership between the utilities and the universities to share data, to share some information so that the programs can develop and they can be meaningful, so they'll both have a win-win out of it.

So part of this has to be setting up the rules for how maybe in some places, sensitive data to be shared with the utilities from a research point of view and getting value.

MR. LAWSON: Thank you. While I don't discount the significance of the issue at all, my questions are more towards some EAC

process and organization type issues. Number one, and I think you may have touched on it, but would this be an EAC working group, or something different?

Number two, if it is an EAC working group, who are we advising? Are we advising DoE on this? And if we are, what is DoE's role on this, and what capacity are we advising DoE. So those are some broader questions I wouldn't mind hearing some feedback. And I don't know if David or Pat wants to chime in on that, as well. Thank you.

MS. REDER: Yeah, I'd definitely be interested in David and Pat's comments. From my vantage point, this topic spans across so many different areas. That's been part of the challenge, is to get a cohesiveness on a direction that actually translates into actions that's very forward looking.

DoE can certainly play a strong role in the collaborative aspect to bring the parties together, but as far as technically, how that gets organized, if you will, and

David and Pat are probably better positioned to speak to that.

MR. MEYER: Well, I guess I would say we all know how critical the electricity sector is to the economy and to national security and so on. That is not quite so evidence, I expect, to people in the Department of Education and Department of Labor. So, without in anyway encroaching on their role and their activities, I think DoE has an important part to play in elevating this issue and getting a systematic strategy in place for dealing with it.

MS. HOFFMAN: So building off of that, yes, number one, we can be a facilitator in elevating this issue, especially with the other federal agencies. Number two, I think there is a need to continue to develop the partnerships between the utilities and the universities, with respect to information sharing.

And I know some of the work we've been doing has been encouraging that, especially through the Work Force training

grant. So number three is taking a look at some of the best practices in the Work Force training grants that we can continue to highlight as best practices. And we did under EP Act do the Work Force assessment, which was the trade skills and the retiring work force.

And I guess I would look at do we need to update that. But I think you actually have a very good document that you guys have started there.

MR. LAWSON: Could I just follow up very quickly? Again, I'm not discounting the importance of the issue, but I'm more getting at how we, as a group, are going to function in this type of a role. And I didn't hear a whole lot there on that. What I don't want us to do is duplicate past efforts and past studies, and come up with the same conclusions, but really not coming up with any better than or road forward.

So I think before we would do something like this, we would need to have a well thought out road to go down here about how the EAC would address a topic like this.

And it's an important topic, please don't take anything I'm saying the wrong way in that way. Thank you.

MR. NEVIUS: Wanda, you probably know more about this than I do, but there's an activity called the Energy Systems Engineering Institute that was created by several utilities at EPRI some time ago. And I had the pleasant and opportunity to speak to a group of graduate students at Lehigh University that have formed one of these institutes.

And it's sort of a cross-cutting type of a program that, I think, is very much needed. In addition to the very specific technical issues, you also need a cross-cutting educational background to be able to pull all these parts and pieces together, as Bill Parks was talking about earlier today, about his work.

So I think if there's something that we can tie in with that, and I don't know how many other schools have such an energy systems engineering institute program, but I found it

to be really exciting and an opportunity for some folks coming out of undergrad into a graduate program to get that experience.

And if there's anything we could do, either by EAC recommendation or the DoE could do, I think it could be very worthwhile.

MS. REDER: Good comments. It reminds me of Bill's comment in the super engineer that came out of some of the discussions that PSERC had sponsored. So I think, in those ongoing dialogues, to the extent that there are lessons that can be extracted from those discussions and contributing to this, it would be useful.

Not only that, and the stimulus dollars that went into the education forums we can collect as input, but there's also probably lessons learned that we can collect from the rest of the stimulus projects, as well, on gaps and challenges where the Work Force Development might be required.

So I do think that you raise a good point, there's a lot of diversity now that's emerging in the skill sets, and there's unique

ways that people are already approaching the subject in order to kind of teach each other. And we need to be able to share those best practices.

MR. HEYEK: I would agree, this is very important. We, in transmission at AEP, we have about 24 or 26 positions for co-ops, and even the ups and downs, we've maintained those positions, relationships with ten schools. But we're 19,000 people, and we have 24 or 26 positions, it's a great feeder system. There are two other areas, I think one, to leverage what you're saying, utility today is different than utility ten years ago, a lot of the things are outsourced, we rely more on the expertise in the contract space. Some of the big players, like AEP and others, are still doing that, but others are not. The other side of it is the university.

I'm on the Industry Advisory Board at Ohio State, and because of funding issues, typically, the foreigner pays full freight, and the University does better with the foreign student than it does with an in-state

student from a monetary standpoint. I think two-thirds of the graduate program of intellectual engineering at Ohio State is filled by foreigners.

Some stay, so there's not -- so those are the two problems. But getting back to what Barry said, I think, even tomorrow, when we do the subcommittee assignments, figuring out what is it that we're advising the DoE. And I think you, David, mentioned it, and you mentioned it, ARPA-E is public/private partnerships that actually has seeded the development of students that actually become entrepreneurs.

I know in the Smart Wire, it came out of Georgia Tech, some students in Georgia Tech, those are the types of things that might be in DoE's space. I think the days of stimulus money are gone, the days of public/private partnership are going to be the future, and maybe through investigating what ARPA-E is doing, and some of the other programs DoE are doing, might be beneficial.

Now, for DoE, we not only are

talking about the four-year degreed folks, we're also talking about the two-year Protection and Controls Technicians, for example, we talked about Power Electronics, those tend to be out in areas that are very remote, not too many students would like to aspire to be in Presidio, Texas, for example, but we need experts out there, and more than the two-year people.

There's a wealth of a foundation in the military, and that is where we're looking towards to actually enhance their training to become the two-year degreed, and actually encourage them to get four-year degreed. So the military is a base that we can use in the industry to actually move it forward. So, to get back to Barry's point, I think the public/private partnerships and DoE, and except for advising the DoE to look at the DoD, as well.

I'm looking for that space, and ARPA-E is the only space I come up with, Wanda, in trying to incent. So I really think we need to peel the onion back to see if there

are other areas that we could directly influence at DoE.

MS. REDER: Yeah, I really appreciate those comments. There are three areas that I probably didn't highlight much in here, and they are critical. The whole migration of two-year, four-year and advanced, we've kind of gone community college, engineering, it's been very siloed.

We don't have a migration path in order to allow the continuity in the education process, point well taken, and we need that. As you well know, we need a mechanism so that we can continue to build on the platform.

Another piece that I think has gotten more and more challenging over the last five years, and is critical in thinking through the reassessment is the foreign national aspect and the education that we do right now for those that end up going abroad, what's the implications there, how much are we putting into that education infrastructure, and then not able to leverage it.

And the flip side, of course, is the

rules that we've kind of had over the last five years, and the challenges that we see in the future. That needs to be taken into account. And then the third piece, and I referenced it in a quick bulletin, but I think behind it is, there's a lot of meat.

And that is, the tendency for outsourcing as comparing to doing work internally, the ramifications on training and making sure that the preparedness is really there. I know the survey work that I've been privy to, we tend to look at the utilities and the mechanisms involved to really understand that outsourcing dynamic is difficult right now.

MR. SLOAN: Well, in response to Barry's, what I heard were a couple of things. One, Wanda saying that the EAC would have an ad hoc working group, which this committee would obviously have to approve.

And David started off our session this afternoon by saying that subcommittees don't make any recommendations, so anything that would come out of what Wanda proposes

would come back here for vetting and such, so we collectively retain control, if you will, over the product.

But to pick up on Wanda's last comments and Mike's, labor unions have had apprenticeship programs for years, we don't have a similar program, and co-ops are not the same thing. I mean, to Barry, maybe, but perhaps one of the things that could occur is that this ad hoc group, working with the Department, brings people together and we start having the universities and utilities think in different terms of what an education flow is.

So, to reiterate what your last comments, and you don't necessarily have to have that four-year degree, but you do have to have the knowledge about how systems work, and that's a reformulation, maybe, of the traditional education plan that community colleges have, that universities have.

And, frankly, I got my first professional job because I had a university degree, and my probably more qualified

competitor did not. Therefore, I was promotable. Not that ever was going to get promoted, but I was promotable, by definition. And some of that is something that might be looked at.

MR. BOSE: Just a couple of comments. The private partnership, the private/public partnership of education and power engineering and electrical engineering has always been there. I mean, if you look at the largest engineering center right now at university, the FERC has been mentioned, and that's basically almost all private companies that are supporting that issue, AEP being one of them.

So that's what is there. The thing that has been missing for a long, long time has been the research support, and think that's where the DoE comes in. As long as there is, there is not going to be any of this engineering education going on if there is no research support for the university professors there.

So the reason power engineering

programs have declined over the years, as Wanda was mentioning, is because they have, there has been very little support in power engineering in the research side. And it is only now that our ARPA-E has come into being, and so on. And I think part of it is the excitement of the new technologies and other things.

But one other point I was going to make is that, remember that much of our manufacturing and our companies have gone abroad in the energy area. Whether that be transformers, whether that be transmission lines, whether that be DC transmission, and so on, most of it, there are very few American companies actually competing in that range.

And this is something that I think the President has spoken to several times, how do we, if you're going to build all these renewables, are they all going to be built in China. That's a real question. But there's certainly going to be built in China, or at least designed in China if we're not going to have the people skills that are here.

And this is where the research and the graduate education comes in. So I'll stop there.

MR. HEYEK: Can you comment about the foreign nationals?

MR. BOSE: Yes, the foreign nationals, it's actually a national problem, I think NSF puts out numbers on this every year. And this is almost nothing to do with electrical power engineering, it has to do with science and math and technology. Basically, there won't be any graduate programs in this country if we didn't allow foreign students to come in.

More than two-thirds of PhDs, 70 percent of all the PhDs given in the stem fields are to foreign nationals. Now, luckily, many of them stay, we're trying to make the Visa situation better in this country to even encourage them to stay, but that's it. I mean, that's a given situation, and what it means is that none of our children seem to want to have graduate education in stem fields.

MR. COWART: Any further comments or questions?

MS. REDER: Okay. I guess without any further questions or comments, I'll conclude. Thank you for your attention and input, and we will -- I take it that we'll go ahead with an ad hoc committee and solicit input for members, and go ahead and move forward. Is that --

MR. COWART: Well, I think I would like to --

MS. REDER: -- do we need a vote, or what do we need to do at this point.

MR. COWART: I would like to hear precisely on that question, and maybe tomorrow, or maybe right now from the Department on how this work effort would go forward, how the Department would use it, how it would be connected to the other agencies that the Department would need to, that you've mentioned and we need to intersect with.

I think we need some more concrete details on, particularly on how welcome this activity is to DoE, first. And then secondly,

a little more concreteness on how it would be rolled out. And maybe that's something for another conversation, as opposed to just deciding on the basis of this conversation that we're done, let's launch.

So maybe that's something for David and Pat to help me understand what we should be proposing exactly to the committee.

MS. REDER: Do you want to pick that up tomorrow, Rich, or do you want to add to the conversation now, how do you want to do that?

MR. COWART: Well, I'm guessing we need to pick that up tomorrow. And just said talk to me, but I'll obviously talk to you, as well. I mean, I think we need to be a little more concrete in what we're going to say to the, what we're proposing to this committee.

MS. HOFFMAN: If we have time, why don't we just add it to the first thing to the agenda tomorrow morning.

MS. REDER: Okay, thank you.

MR. COWART: Thank you, Wanda. I think it's going to be Elliot's turn next to

let us know what our plans are for the evening. Are there any additional or wrap up, or final comments from committee members concerning this afternoon's discussion? Elliot, you're on.

MR. ROSEMAN: Thanks. A number of you signed up to join us for dinner at the MS Grill, which is just down the block at 8:00 this evening. If you don't want to come, that's okay, let me know.

A couple of other things; if you would, leave your name tags and your registration at the desk, that would be great to be able to pick them up in the morning. Take everything with you, don't leave anything here in the room, bring it back with you in the morning. And the only other thing I wanted to mention was that, over the weekend, a number of you received a sign up sheet for a subcommittee list, I don't know, Rich, how you want to handle that, but at some point, if you have happy with the subcommittees you're on, great. If you want to sign up for additional ones, you may or may not, that's your

decision.

MR. COWART: We're starting at 8:00 tomorrow morning. Thank you very much, we are adjourned.

(Whereupon, at 5:00 p.m., the PROCEEDINGS were adjourned.)

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CERTIFICATE OF NOTARY PUBLIC

DISTRICT OF COLUMBIA

I, Carleton J. Anderson, III, notary public in and for the District of Columbia, do hereby certify that the forgoing PROCEEDING was duly recorded and thereafter reduced to print under my direction; that the witnesses were sworn to tell the truth under penalty of perjury; that said transcript is a true record of the testimony given by witnesses; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this proceeding was called; and, furthermore, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

Notary Public, in and for the District of Columbia

My Commission Expires: January 14, 2013