UNITED STATES DEPARTMENT OF ENERGY

ELECTRICITY ADVISORY COMMITTEE MEETING

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P R O C E E D I N G S

(8:06 a.m.)

MR. COWART: Good morning, everybody. I think we're set to begin. As always for the benefit of members of the public, let me remind everyone that a transcript of this meeting is being prepared. And if there are any members of the public who will want to address the committee, there is some time set aside for that later this afternoon and you should sign up with the registration desk out in the hallway. We've got a long day. We need to process a very large amount of work done by the subcommittees in the past few months. So I'm looking forward to getting going on that.

And so I'm just going to start and get going with the Transmission Subcommittee. You've got recommendations in front of us as well as ideas for a work plan for 2013. Mike Heyeck?

MR. HEYECK: Thanks, Rich. Subcommittee has been very busy and you have three recommendations before you. One on the next

generation EMS, another on non-wires solutions, and a third on mobile generator sets for grid resiliency. We also did some other work. One is we offered a recommendation in the public process regarding the PMAs. I think it was a very thoughtful entry and I think as Lauren reported yesterday, it was well taken to make sure that we're taking advantage of Section 1222 which is the aim of DOE's effort. So we're pleased with that. We also have an effort on asset life, we call it aging assets; myself not included in that. But the aging life or asset life effort which we're going to talk about, that is a 2013 effort.

A couple of 2013 efforts I just wanted to indicate, one is we're going to pick up the ball on interconnection wide planning funding. As you may recall a couple of years ago the DOE had $80 million that they doled out to create EIPC and Ice Pick and fund efforts in the west end of Texas as well. We're going to probably pick that up and finalize in March and don't be surprised if we're going to ask the DOE for additional funding that

effort. And I quote Lauren very often on this. The process is even more important than the result in that regard. So those are the 2013 efforts. We have others that may come up such as power electronics that we left on the side in addition to other elements of technology and grid resiliency.

So we do have a plate full for next year, so thankfully we're coming to conclusions on three of our items this year. The first is the next generation EMS. We had a lot of discussion yesterday and again, the analogy for me is imagine the FAA and Air Traffic Control System with a thousand more planes in a couple more years; A thousand times more planes in a couple more years. We have to stay ahead of the effort. And the recommendations are pretty broad and it may be likely that the Transmission Subcommittee will get a little deeper into this next year with the DOE. The first is really what Anjan has been doing and that is to convene technical conferences or webinars to scope out the issue a little more

deeply than we have that our four panelists who did an excellent job yesterday.

And then the second is to convene math and scientists. So if you look at the roadmap, it's almost a predetermined path, but I will caution you that it will likely change depending on each step as we go. The nirvana in this is that it's quite likely that DOE will not be the funder of last resort on this and nor should it be. I think the panelists offered a portfolio of opportunities talking about creating an architecture that allowed others to play and develop plug and play type applications. So that may be one way to look at this. Another impediment institutionally is the greatest customer of the next generation EMS are the RTOs and ISOs or any large balancing authority outside the RTOs.

There are very few customers and as was mentioned yesterday, the vendors are really not incented to create the next generation EMS. But as you heard yesterday, if we don't do this they

told us -- I think Ralph said this just before the meeting -- they told us that this is broken and it needs to be fixed and we need to address it in the next five years. So another possibility of funding -- well, let me go one more paragraph on the institutional barrier in funding this. Someone mentioned it yesterday that on a percent of revenue basis, I think the industry spends less than the pet food industry. So one of the areas of concern in the RTO ISO space is that they're being constantly told or governed to keep their administrative fees low, which doesn't give them head room for RND.

So another avenue of funding may be that we create some head room either from the bottom up through the members or from the top down through some charge or some form, in order to come up with a funding mechanism for this. These are not outlined in this paper and I'll just caution you, if you look at it, it doesn't discuss these. What I'm presupposing here is if you buy into the first recommendation to convene something, and that's

where DOE is best at, it may yield a roadmap that might be different than what's here. Regardless, I'd like to consider this roadmap to be the one to be approved and if there's any variability on this, we will bring that to your attention in the next year.

I'm going to stop there on the next generation EMS paper and take some questions, comments. I know Dave Nevius has some edits on the historical perspective. My memory is not as good as his in some of the things that -- since he was born in the 1800s. But you're going to get those to Paula. But I'd stop and welcome any comments. Dave? Dave Nevius?

MR. NEVIUS: Yeah. I had one more substantive -- well, I think it's a substantive comment in the recommendations themselves. We talk about some of the specifications and we have a lot of good information there. One specification that needs to be mentioned I think, is the ability to better model special protection systems of medial action schemes, wide area and

local area protection systems, safety nets, and the whole family of relay systems, relay schemes that have been involved or even clausal in blackouts since 1965. And I think having a better understanding of them and model them more accurately in the EMS area would be a plus to mention them specifically.

The other things that Mike mentioned are more in the history portion of this and I will give Paula comments there. There's a mention of leading to the passage of the Electric Power Reliability Act of 1967. I wasn't involved, but that was never passed. Floyd Goss from LADWP led a group of CEOs to lobby Congress to not pass that, but rather allow the industry to deal with that and that's what lead to the formation of NERC. So I'll give Paula some words there to correct that. The only other thing Mike, in that beginning where it talks about the shortcomings of today's EMS, there's an analogy about driving using extrapolations from your rearview mirror.

And of course, the basic tenant of

reliable operations is operating within N minus 1 criteria. So I'm not sure that analogy takes that tenant of operation into account. It leaves the impression that we're not looking at anything. I think somebody was talking yesterday -- Robin was talking about his wife driving looking only 10 feet in front of the car. That's not the way we operate the system today. At least that's not the way we're supposed to operate it. So I'm not sure that analogy really is appropriate or it may lead to a misunderstanding or a misimpression, though I'm not sure what words you want to use or what other analogy, but just a suggestion. Thank you.

MR. HEYECK: Just an explanation of the analogy basically is by time you create a state of the system, you already passed that state and that's really what driving with your review mirror was, based on extrapolations of your rearview mirror. I can eliminate it so that we don't have to develop three paragraphs to explain the analogy.

Other commentary?

MR. COWART: Merwin.

MR. BROWN: Merwin Brown, California Institute for Energy and Environment. I wasn't part of this team, but having read your report, I thought it was extremely well done. I thought it captured a good deal of the issues and described them rather well. And I'm not disagreeing necessarily with Dave on any of his comments, but I'm just saying overall I thought it was very good and support what was said in it.

MR. HEYECK: Thank you, Merwin. Other commentary?

MR. COWART: Barry?

MR. LAWSON: Yeah, two quick items. In Recommendation 6, I know we're talking about this collaborative and it includes NERC and other technology leaders. I wasn't sure if that included some industry people and would suggest that we add industry folks to that collaborative. And then I have one other point, but I'll let you address that first.

MR. HEYECK: Which recommendation,

Barry, again?

MR. LAWSON: Number 6.

MR. HEYECK: Number 6.

MR. LAWSON: And I know it lists NERC and other technology leaders. My suggestion was to add some industry folks to that collaborative.

MR. HEYECK: And technology and industry leaders.

MR. LAWSON: Sounds good. And I would echo Dave Nevius' comments on the example about the driving the car down the road. I didn't think that was really needed to make the point. I think the point has been very well made out and I would recommend taking that out. I didn't think it was necessary.

MR. HEYECK: It is removed. Thank you.

MR. COWART: Paul Hudson?

MR. HUDSON: Mike, it's implied throughout the paper here, but it seems to me that there is an element here of sort of, the human and tool interaction piece that we may need to be a bit more upfront in addressing. I don't see

operator mentioned anywhere in your recommendation piece. And you know, in sitting in the ERCOT chairs for example, being overwhelmed with information and systems is something that is very real in the face of all of this new data and all of these new tool sets and I'm wondering if there's a place to set aside a recommendation around that sort of human and tool interaction?

MR. HEYECK: That's a good comment and in the '70s I was on a committee called the Man-Machine Interface. We now call it the Human Factors thing, but point well taken.

MR. COWART: Ralph Masiello?

MR. MASIELLO: Yeah, you know, Mike, to respond to Paul's comment, in the meeting Anjan convened at DOE there was a unanimous consent around that point that the visualization technologies and the way information is presented needs attention too. And people, I think, missed it in passing yesterday when Eugene pointed out if the control centers could just share screens, a heck of a lot could be gained. You know, if the

operators at PJM could see what the operators in New York and the Midwest ISO and TVA are seen on their screens and that's on a selective basis, that raises a host of process issues. But it was a pretty good idea by Eugene; cheap, easy, effective.

MR. HEYECK: Any others?

MR. COWART: So how would you like to proceed? Are you looking for --

MR. HEYECK: I recommend approval of the document including the changes that were noted. And we have historical changes that Dave Nevius will offer and I'm eliminating the rearview mirror comment, I'm including the human interaction, the operator element in one of the recommendations or a separate recommendation, and whether we include sharing screens among the adjacent regions. So those are the comments that I've -- and to include industry leaders in addition to technology leaders.

MR. COWART: So here's how I think we probably have to proceed and I can ask David Meyer

about that. I believe this document is close enough to final that we could approve it at this meeting subject to understanding that those changes will be made, followed by a circulation of the document to members of the committee, and an opportunity for any member to basically ask for a reconsideration. Does that make sense, David?

MR. MEYER: This is a judgment call that the committee should make right now. It's whether you feel you're close enough to not need that final step. To just say, we're going to make the changes that have been identified and the document is going to be final and it'll be submitted. I think we're close enough at this point for that to be considered as an option. The other option is as Rich has explained, that we make the thing final, put it out one time, say any objections, last chance, otherwise within four days or something it's final. So you can go either way.

MR. COWART: All right. Barry? Comment?

MR. LAWSON: I mean, I don't see any

reason why we have to go back out with it a second time. I mean, with the changes that Dave is going to make are historical background changes, everything else is clear. I mean, I would be comfortable in just having a final vote here. I hope everyone else would be.

MR. COWART: All right.

MR. ROBERTS: Won't that come out in the vote? I mean, if anybody abstains or if you make a motion that it be accepted as is and nobody abstains, it should be fine.

MR. COWART: It should be fine if -- I just want to be clear that we've identified precise changes that are going to get made to the document and we can approve it knowing that those changes will be made. We can approve it today. That's fine by me.

All right. Is there such a motion?

MS. REDER: So moved.

SPEAKER: Second.

MR. COWART: All right. Thank you. All in favor, say aye.

GROUP: Aye.

MR. COWART: Are there any objections? All right. It's unanimously approved with the amendments to be made as discussed. Thank you. Next.

MR. HEYECK: The next topic is the non-wire solutions and I wanted to ask Mike Weedall to lead that discussion.

MR. WEEDALL: Thanks, Mike. So we do have a paper that has been put out on the non-wires subject. First of all, I want to thank the people that worked with me on this, certainly Mike Heyeck and his leadership; Mr. Cavanagh, who's not here; Susan Kelly; Dian Grueneich; Sonny Popowsky; Tom Sloan; and as ever the great support of Elliot and Paula in putting this together.

Just to make sure we're all on the same page, the definition of non-wires as we're talking about it is any action or strategy that could help defer or eliminate the need to construct or upgrade a transmission or distribution substation.

So one thing I'm always sensitive to as

the demand side guy and certainly struggled mightily within Bonneville Power to change some of the planning practices there, is that I really want to make sure that people understand that we don't overpromise on the non-wire stuff; that there are most opportunities, most instances where, you know, non-wires isn't going to work. You know, and I can go into a lot of detail there but there are those cases that come along where non- wires makes a whole lot of sense. And the benefits that I'll talk about in a minute are truly significant.

One thing, again, that I learned over our learning experience in BPA is that a number of people think of non- wires as strictly demand side options, you know, the energy efficiency demand response, et cetera. Really there's a whole variety of tools in the box that can benefit.

Just had this fabulous experience just before I left BPA where there's a need to upgrade the transmission into the Portland area because we all have to have air-conditioning now for the 4 or

5 days a year that the temperature goes over 90 degrees and very, very contentious public process associated with that. When we studied the non-wires, what we discovered was if you shut off Centralia, which is a generating plant north of Portland, and you fired up some generation south of Portland, no need to build that line for 20 years. So again, I just throw that out as an example of it's not just demand strategies that people immediately go to with non-wires.

One of the benefits associated with non-wires, obviously unnecessary construction, all the environmental benefits that are associated with that, certainly a BPA. We struggle all the time with our availability of capital dollars and where they were going to go. If you can avoid building a line, obviously there's minimizing the risk associated with stranded investment. There's rate increases associated with a transmission that you can avoid.

So you know a question that one might immediately say is, if this makes so much sense,

why hasn't there been more analysis of non-wires to date? You know, why do we immediately just think we have to put that steel and wire in the air? I'm going to go back to what I've mentioned already, which is I think people don't fully understand the full variety of tools that are available out there that is more than just the typical demand side tools.

Secondly, and to me this was the number one learning experience that we had at Bonneville Power, and that is if you don't do this right at the front-end of a planning process, it's too late. You know, typically the way that Bonneville did it and I think some other people might be looking at it, it's in the checklist that the box ultimately has to be looked at, but if you bring it to the table too late given the magnitude primarily or especially given the fact that you're looking at transmission deferrals, you just don't have the time to put those alternate strategies in place. And then certainly there needs to be more detail as far as gathering the information to make

sure that, again, you're looking at all of the non-wires alternatives, and I've already mentioned it's more than demand response. So the recommendations in the paper are that certainly DOE, again, has the bully pulpit to educate.

You know, develop outreach strategies to bring people along on understanding exactly what non-wires is and the full magnitude of what can be applied there to develop planning guides, et cetera, for the various state agencies, utilities, et cetera, that should look at this. That includes obviously case studies to really look at the best practices and make sure that those are shared nationally and then to really keep our eyes looking forward. One of the things that certainly struck me yesterday is that we do have a changing marketplace, much more of a competitive marketplace that's coming. The world's really going to evolve for utilities to make sure that as those changes become apparent that, again, the non-wires and the transmission alternatives are factored into that.

And then there is one last significant barrier for me and that is financially how do you deal with the non-wires? If you go back and you look at the BPA website and you look at all of the issue papers that we put together on this topic, you'll see that we resolved every issue but the latter one. One of the barriers that, again, continues to be out there is if you are looking at typically a transmission project, then you're going to socialize if you will, that cost across say the Northwest in the region. But if all of a sudden you're now thinking of a demand side project, a non-wires solution, that may hit locally and figuring out how to deal with leveling that financial playing field to me continues to be the number one outstanding issue.

So those are the recommendations in the paper. Mr. Cowart? Questions? Comments?

MR. COWART: Comments. Mr. Curry?

MR. CURRY: When the closing of Indian Point, a large nuclear generator north of Manhattan, came up for yet another time in the

political spectrum, I asked one of the local utilities if there was a non-wires solution to this. I had to ask three or four times but ultimately found that perhaps indeed there was a non-wires solution to this problem and the cost was a fraction of what had been talked about widely as a likely cost to, gee, the New York City (inaudible). We already are the beneficiary of a lot of help that we're giving to the utility industry and the generating industry in New York and, with apologies to Commissioner LaFleur, maybe giving them even more help.

But the point was that the process is so broken in so many aspects and has been for so long that when there's a prospect for a north-south line in New York State, for instance, taking Canadian hydro down to New York City or even, with apologies to Commissioner Norris, Iowa wind to New York City, everyone thinks this is -- at least we can maybe pull this off because we have the cover of a "concern or crisis" and we can pull it off.

I think that one of the virtues of what Mike has

done is taken the perspective of essentially enough for profit and looked at the realities that weren't tinged with how can I get something off this Christmas tree? I've got some ornaments I've been meaning to hang on there for a while and here's the chance to do it.

I'm not suggesting that there's going to be a non- wires -- that there's going to be, A, any solution to Indian Point; B, that it's going to close. Although I can talk about it now, I couldn't before. But at the end of the day that's one of the responses that the industry has to a situation that is always under siege from one direction or another.

And I think Mike's approach, the suggestion that DOE take the bully pulpit role, try to get a playing field as level as possible -- because, again, with apologies to ISOs around, the transparency issue is not very great in the Northeast at least. Maybe in the Southwest power pool, but not in the Northeast. And this is a very, I think, strong recommendation, good policy,

and the right thing for us to be behind.

MR. COWART: Thank you. Tom and then Barry.

MR. SLOAN: Tom Sloan. On Recommendation 1 I would encourage, at the risk of sounder parochial, that two legislative professional organizations -- National Conference of the State Legislatures, or NCSL, and Council State Governments, CSG -- be included. And I do that because legislatures are the body that set the priorities for commissions and for utilities. In some ways we define what can be recovered through rates and can either encourage or discourage a regional planning solutions.

MR. COWART: Barry?

MR. LAWSON: Yeah. I guess I'll start my broken record pattern for the day. Under the -- also the first recommendation, I realize it's not an exclusive list. It says "including," so, I mean, obviously DOE could invite whomever they want and I expect they would. But I would like to see industry representatives somewhere in that

first bullet recommendation, similar to what we talked about for the next generation EMS recommendation. Thank you.

MR. COWART: I assume no objection. Is your card up from before or are you up again?

MR. BROWN: No, I'm up again.

MR. COWART: You're up. Merwin?

MR. BROWN: I just keep popping up, don't I? Yesterday I asked the panel of RTOs, ISOs, a question about how they saw the new EMS as whether or not it was just enough to keep things status quo and keep the lights on or was it a potential tool to expand capabilities, particularly to increase the capacity of the transmission system due to operating practices that right now are extremely prudent and we have to do and it leaves a lot of capacity on the table. And I think one of the top examples of that are the stability constraints that are at least put into the West. I don't know enough about the East to know what they have, but in the West it puts thousands of megawatts of capacity

out of reach to be used.

And I think there are new technologies coming along that, for example, can take the teeth out of low-frequency oscillations and allow some of those margins to be relaxed and we can recover some of this capacity. And in this report and Mike also alluded to it, the significance of looking at that aspect which is getting more out of the existing assets, that this paper, it mentions it right up front I notice, but then it doesn't seem to follow through with very much description of how one would go about increasing the capacity of the existing infrastructure. And there aren't any really strong recommendations in this area and I think it's an extremely rich area of research and development.

I have to admit I wasn't giddy with the answer I got out of the panel yesterday, but, again, being in their position I'd probably take a conservative approach. But also if I look back 10 years ago of what we were using to operate the grid, it's very different today and probably those

people too, would have objected to some of the things that are going on now. I know for example already, SynchroPhasor data is being used in the operation of the grid and not near what it can, but 10 years ago that wasn't even considered a possibility. As a matter of fact, a lot of people thought it was something that was totally silly and today it's a new attitude.

And so looking into the future, I think we ought to not be too narrow-minded and have a broader look to see what can be developed. So my suggestion is that this paper put a little more emphasis on that area to balance it with demand response and some of those other kinds of non-wire solutions that are more popular today.

MR. HEYECK: Rich, I just wanted to -- this is Mike Heyeck. Merwin, I agree with you wholeheartedly and I think Mike Weedall would probably knows that just the advent of PMU's have determined or uncovered some oscillatory behavior that can be addressed very simply in order to improve the capacity of the grid. So there's not

any deliberate attempt to exclude that, but the next generation EMS will be very helpful in uncovering issues that could be corrected thereby improving the capacity. So point well taken.

MR. COWART: Let's just continue to take comments. I'm not quite sure the order of everybody, but I think Gordon's probably next.

MR. GORDON: So I was just struck -- Gordon van Welie, ISO New England. Struck by the absence of the mention of the FERC in this set of recommendations given that they end up regulating the people or the planning processes. So I guess from my perspective, it would be ideal if the DOE is going to be asked to engage on this topic to coordinate it's efforts with the FERC. I think if it doesn't do that we risk creating confusion in the various stakeholder processes around this discussion.

MR. COWART: Paul?

MR. HUDSON: My experience is that the different sectors that you've mentioned here very much operate in silos and the transmission

engineers don't necessarily speak energy efficiency and the energy efficiency folks don't necessarily speak DR and if you put them in a room together they often look at each other in alien fashion. And I'm wondering if we can acknowledge in the paper that we need to jam some different constituencies together in such a way so that the transmission engineers actually believe in the veracity of demand responses and adequate solutions; same thing for energy efficiency.

MR. WEEDALL: Excuse me, I have to editorialize. Bingo.

MR. COWART: All right. Coming back around, Tom and then Billy. Oh, it's Dian. Sorry, I read the wrong card.

MS. GRUENEICH: Having worked on this with Mike and Mike, I really appreciate what appears to be support in this area and one of the areas for the recommendations is I think what we call, best practices. And when we were reviewing this, the last document put out was back in 2009, the DOE had helped fund. And that's one reason

why we've called this out that when we reviewed that document it was basically outdated and didn't give that much information. And so I just wanted to emphasize actually getting a document out that's a little bit more updated, that's a little bit more robust would be helpful.

When I was a commissioner, as Rebecca knows since she's taking it over, we formed within the DOE-funded transmission expansion planning process and demand side management group and we were able to get the technical help from the LBNL, and it was utterly eye-opening what we discovered which was that each of the balancing areas submit to WECC and I think perhaps to NERC as well. Embedded within their forecast is some assumption about energy efficiency and demand response and that for the most part it was what we call committed, which is literally all that was funded.

But we found out that there was very significant discrepancies in what assumptions were made about adopted federal appliance standard and adopted standards and even greater discrepancy

about what would be the saving going forward even if that state had a mandated energy efficiency goal looking forward. And that's where we were able to bridge the gap of having the utility transmission planners who's put together this data, have it reviewed by the state officials, and get in agreement. And as we point out in this paper, it actually dropped the forecast 4 percent in the annual energy and 5 percent in non-coincident peak demand for the entire WECC. I mean, a huge difference and this one aspect that even if it's not avoiding a line per se, it's so important when you're thinking about transmission expansion planning to make sure that you've got good solid tools and quite frankly, that they use somewhat consistently across the regions. Thanks.

MR. COWART: Are you making a recommendation about a change to the paper or is the paper fine? Okay, thank you. Billy?

MR. BALL: I actually have several things. One is to tell Paul how much I appreciate him advocating a vertically integrated utility

model because I believe that's what this is. Because --

SPEAKER: (off mic).

MR. BALL: But that's exactly what we do. We get everybody in the room together and talk about all the solutions. Mike, you may not be familiar with this example. Several years ago, probably more than I think, time seems to fly, there was a great example of this in Georgia, where through the integrated resource planning process there'd been determined a need for additional generating resources in the state. At the same time, there was identified a very significant transmission infrastructure need to support the city of Atlanta in the long term. At the time it was growing very, very quickly.

And through those state processes and working with Georgia Power, it was determined that the next request for proposals to meet the generation need should specifically call out the value of deferring transmission investment by specific placement of generators. And actually,

through that RFP process a number of the needed transmission improvements which for being the transmission guy, I knew would be difficult to actually make happen because of their location. We're actually permanently deferred. I guess that means that we're never going to do them as long as the plan is there because of the placement of generation. And I thought that was a great example of a state-integrated resource planning and RFP process bringing all of these different issues together.

My final comment really to address Merwin's topic, I don't disagree with what you're saying at all. I kind of approach it from a different perspective being an operator and that is I do have high hopes for technology advancements that allow me as an operator, or someone who is responsible for operations, to understand where my current state puts me with respect to what I call "the edge." That means in some cases new technology, new knowledge, may mean that I need to be more conservative than I have

historically been because maybe I didn't understand how close to the edge I was.

Yeah. In other cases, new knowledge, new technology may allow me to move -- I may have been farther away from the edge than I ever needed to be, but I just didn't know. So that may allow me to free up, in your example, some capability and yet be very prudent in the operating state I maintain. So I don't see it as one or the other. Anything that gives us greater clarity to where we are in the operating realm, really allows us to optimize, that may be the better way to say it, optimize how we use all our assets.

So that's kind of the way I view your question, but I totally agree that these technological advances will be helpful. But it may not always yield greater access to or greater usage of transmission assets. We may actually find we were closer to the edge than we thought. But I don't have any changes.

MR. POPOWSKY: Thanks, Rich. This is Sonny Popowsky. Just real quickly, getting back

to Recommendation Number 1, Mike. Originally this was a fairly narrow group that you were reaching out to in line with Tom and Barry's comments, I would certainly urge inclusion of our consumer organizations like NASUCA. I think we are the -- hopefully, we'll be the primary beneficiary of these kind of recommendations, the consumer. So we'll just include those in paragraph 1. Thanks.

MR. COWART: Paul?

MR. CENTOLELLA: Paul Centolella. I wanted to briefly respond to Dian's comment and put it in the context of something that Billy and Paul said. I think there's a subtle but important difference in the way some of this paper's worded that I think is important for the planning process, and that is that these non-wires alternatives ought to be looked at on an integrated basis, which means more than simply go to the states and update the assumptions about what demand response and other non-wires alternatives will be and build those assumptions into the planning process. But rather instead,

look at that planning process on an integrated basis and ask, what would make sense in terms of the economics if one does or doesn't do a particular transmission line? And that produces a potentially different result than simply having an updated set of assumptions about non-wires alternatives that would be there in any event.

MR. COWART: In a minute I'm going to ask Mike how he wants to deal with all of these good comments that probably need some thoughtful processing. I'm going to make one myself, Mike, which is that I find there's really a lot of good material in this paper and I would like to see the committee be able to take steps to get it out. I was struck at the appendix, that there's just these two excerpts from two different state commissions in one process that seem to me inappropriate for a paper that's covering the whole country. So I think I would recommend either creating an appendix that has 10 excerpts from a lot of different decisions or just removing it.

Is there a problem with that? It's okay? Okay. Comments back from you about how you would like to proceed? I want to be really careful about making sure that this committee is fully supportive of any paper that we are releasing, recommendations to the secretary. And I want to make sure that folks are comfortable with how we proceed from here. There are two paths that leads to here. Mike?

MR. WEEDALL: Well, I'll also look for some input from Mr. Heyeck over there as far as how to proceed. I at least personally feel a little reluctant to take the tactic that we just adopted which is to make a few changes and just go ahead with the paper. I do believe that we have enough comments here that we should go back and revise the paper. And if David feels comfortable, then just approve the paper through e-mail or a conference call or whatever.

MR. COWART: Mike?

MR. HEYECK: Exactly. I would agree with that approach if it's acceptable to the

committee. I think this initiative is so important to get out there. I would hesitate to wait until March, so if we could do it electronically, that would be helpful.

MR. WEEDALL: All right. And I was just dying to revise this paper still again.

MR. COWART: All right. We have a fairly concise list of recommendations to the authors. I personally think it can be dealt with electronically without having to wait until another full in-person meeting of the committee. But I agree with the observation that it would be good to give committee members the opportunity electronically to see the changes and to approve them or ask for an opportunity for another full discussion. And what you can expect is a paper to be circulated with changes clearly identified so that you can easily see them and an opportunity to ask for another discussion in front of the full committee or one way or another, electronically or otherwise, or simply silence will be interpreted as assent and the paper will be approved and

submitted to the secretary.

MR. MEYER: On process here, I talked with our general counsel people about this and the wicket we have to go through here is to follow some kind of process that maintains transparency, openness to the public about what we're doing. And so what this means is once you have a draft that you think is truly ready for approval, you need to post that on the EAC website, we need to put out a federal register notice that says, this is what the committee intends to do as an alternative to delaying action until the March meeting. And so, in effect, you tell the public, if you have comments on the paper that you want to give us or comments on this proposed process, please give us your comments.

You would not be locked into accepting those comments. You might want to deal with them, accept some of them, but it's a judgment call on your part. But it has to be done through this process. So the one point I would say is if there are, say, two or three reports to be dealt with in

this way between now and March, if possible you might batch them out so that we're only talking about one Federal Register notice and one process rather than three processes.

MR. COWART: Okay, that's how we'll proceed. Rick?

MR. BOWEN: Yeah. My only comment was a kind of a process one. I get like 250 e-mails a day. If in the subject line when you guys send those out for approval like that or for some type of formal process like we're talking about here, if somebody could put in that subject line, Urgent for Approval or something like that, so it gets out attention and we don't just kind of blow by it. Because I know I'm on several committees here and I get a lot of drafts coming through of documents that we're moving around and I may not get to those right -- I'll wait until the weekend to read them on the weekend or something, and I don't want to miss something if you guys are going to do it that way or be subject to approval by lack of response. So yeah, if we could just do

that, that would be helpful to me.

MR. COWART: All right. Tom, do you have a comment?

MR. SLOAN: Tom Sloan and it's a question for David on the process. What kind of timeline would the federal notification and public comment period and all entail if this were handled by the two Mikes within 10 days, by the end of the month? When could we finalize and send the secretary our report?

MR. MEYER: Well, let me walk through the steps here. Internally it takes DOE the better part of a week to get a Federal Register notice ready to go. Our office would have to draft it, we send it to the lawyers, they approve it, then one of their people takes it to the outfit that publishes the Federal Register. It would appear about a week later, so you'd say that's a week and a half. Then it needs to sit out there in front of the public for, I don't know, I'll have to talk to GC about this and see what they think, but I would say at least two

weeks to avoid seeming to be jumping the gun. But presume then that this process would take roughly a month total before you'd be -- yeah, and Pat says that's optimistic. But it certainly beats waiting until March to get some products out, I think.

MR. SLOAN: And I assume that we'd have to then spend a couple of weeks to make sure that we have dutifully considered whatever comments might occur and that we would circulate a final final draft to the committee for approval. So we're looking at six weeks with the holiday period. So seven or eight weeks probably.

MR. MEYER: Well, I think it's a good idea to try this process and learn from it and find ways to streamline it as we go. The first time out we'll probably make some mistakes but I think we can probably learn from the process.

MR. SLOAN: Yes, Mr. Chairman, I'm wondering whether we really are that far away from a consensus on what needs to be revised in this and whether we actually need to -- I didn't hear

anybody objecting to the suggestions made around the table. So I'm just not sure that we need to go through that longer process.

MR. COWART: All right. We've got a couple more comments here and then I think we're going to need to move onto the next topic. And we may discover that there are other agenda items later in the day in which we're going to have the same conversation again or the same options in front of us. And so it might affect how we proceed. Billy?

MR. BALL: Well, you may have just made my comments irrelevant with saying that this will be readdressed. As I listened to the process and thought about the time of the year, it just made me kind of wonder, would we just be better served to wait until March to be honest? Maybe there is value in trying something new, but we may find potholes there through our process that will make it just easier to wait.

MR. HEYECK: Just procedurally, I don't think Mike Weedall has 12 people to distill 1,500

comments. So we've got to be very careful that if we do buy into the process, we actually do buy into the process.

MS. HOFFMAN: I don't know, he has a lot more time on his hands.

MR. COWART: All right. Ralph?

MR. WEEDALL: Yeah, I'm really going to comment on that one.

MR. MASIELLO: Forgive me if I've missed something, but in prior years we didn't have a process to get the draft work in front of the public and factor public comments into it. And what I'm hearing today is something that says, if we approve this document today, it's done. If we don't then the document's open for public comment as opposed to the public is attending a meeting where they can hear the debate and discussions and offer comments. And there's some kind of distinction in here that I don't -- I'm not sure I get it, but has something changed since 2009 and '10 and '11?

MR. MEYER: No, no, no. The public has

the opportunity to comment at the end of the day today and there's no intent to make this electronic alternative any different. Now I have no idea what kind of response we would get from that Federal Register notice. I just don't know. Because we do put Federal Register notices out about the committee and about this meeting, so.

MR. MASIELLO: Yeah, but we don't share working papers with them, right?

MR. MEYER: Well, the drafts are -- they're public information.

MR. MASIELLO: On our website?

MR. MEYER: I don't know --

MR. MASIELLO: That's what I'm trying to ask about, David, because we've never had --

MR. MEYER: Oh, I see.

MR. MASIELLO: -- a public comment saying this document, this page, you're wrong.

MR. MEYER: Yeah, you're right. You're right. That's true.

MR. COWART: Well, it sounds like further conversation is in order with OGC because

my thinking had been the same as Ralph's, that is that this meeting is publicly noticed and the public has the opportunity to be here, listen to the conversation, and to address us. And, therefore, the continued wordsmithing on the document itself could be done by the committee right here, right now. And so then you wonder why we have to launch a detailed public comment period on the document itself as opposed to having actually accomplished that by publically noticing this hearing and this meeting. So maybe we just need to scratch our heads on that. Barry?

MR. LAWSON: I would just say, I think, Tom, you stated it pretty well. I don't know that we're that far off and I don't really see a reason to have to put this off a few more minutes and I think we could be where we need to be unless I'm missing something. Otherwise, I would echo the preference for waiting until March. I don't think the Federal Register process is one where we're going to get a lot of efficiency built into it. I don't think we're going to reform that with our

little exercise and I would prefer to either take care of what we need to take care of here today or go to March. With the holidays and everything, as Billy said, I just don't see that getting a lot of attention over that timeframe.

MR. COWART: So let me make a suggestion that we confer over lunchtime and come back to the committee this afternoon with a very concise list of changes that can be made to this document to move it along in a way that's very consistent both with public notice opportunities and with the will of the committee. Okay.

All right. Thank you. And thanks for the good discussion.

Next on your list, Mike?

MR. HEYECK: Since I won't be here after lunch, Mike Weedall, you have the pen and the gavel for our transmission subcommittee on this subject.

MR. WEEDALL: Dangerous, Mike, dangerous.

MR. HEYECK: The next item is mobile

generators and I'll just turn it over to Billy Ball.

MR. BALL: A little different. This was this very brief -- well, I've got the wrong paper. This very brief three-page document is really in response to a specific question and that's dealt with in the first part of the paper. Basically the question was, what's the committee's opinion on the value of the department establishing a portable generation reserve? So is there any value to the resiliency of the power system for the Department of Energy to -- or I guess even another governmental agency, but in particular DOE, to establish a I hate to use the word "stockpile," but a set of portable generators that could be then dispersed or potentially preplaced and if that would be helpful during outage periods or otherwise provide additional resiliency to the system?

David Till, who's here, I didn't see you yesterday David, but you're here now, thank you. David did a great job -- actually did most of the

drafting here and I appreciate his work and everybody else. You'll see basically this very brief letter comes quickly to the conclusion that we don't believe this is an action that the department should take. It's a great idea, but as we wrestle through it, we actually thought that it would actually be a pretty complicated process. You would either end up with a large number of generators sitting somewhere, then you have to move them, just a number of things. And also I think politically, at the top of page 3 you see the statement at some point you get to the point of picking winners and losers because you'll never have enough mobile generators to give one to everybody. And that seems to be a difficult spot to be.

So I think you can read the paper. I think maybe the easiest thing, David, unless you have anything you want to add, is just to see if there are any questions. It is a pretty brief document, again, pointing to a very specific question that was asked.

MR. COWART: Thank you. Comments on this paper? Commissioner LaFleur?

MS. LAFLEUR: Yeah, thank you. I just looked at this paper so, hopefully, I haven't forgotten as I'm going to ask this question. This paper was about having the deal we organize or oversee as strategic reserve, I guess, at this strategic petroleum reserve or whatever. My question is, is there an industry-led effort already here? I know there's a spare equipment database that relates to high-voltage transformers that is intended to facilitate an emergency sharing of transformers or at least knowing where they are. Is there something like that for this roll-on generation that exists now or is it an idea that we should think about?

MR. BALL: To my knowledge there's no such formal process. If you were asking about -- certainly there are, and Dave's familiar with it, from a NERC perspective as well as there's an EEI STEP effort that the Edison Electric Institute and others participate in. Not that I know of. I

will tell you just from a practical standpoint, someone who's lived through a bunch of hurricanes, there are a number of vendors out there. So finding mobile gen sets actually -- these are things as well that you can -- in theory, in your preparation measures, these are things that are easily handled by pre- contracting with others or determining where you may need these and pre-placing them.

So I don't -- just sitting here, I'm not sure that there's a lot of value in trying to create that. I've never in my experience never been in a situation where I've been called by another utility. But certainly if I was, we would help them in any way we could.

MS. LAFLEUR: Thank you. I mean I've used them, too, but just in one-offs, but never -- you know, I don't know that there's enough of these roll-on sets around for a big hurricane or something. But I don't know, maybe.

MR. COWART: David?

MR. NEVIUS: I agree with the paper as

written, but I think it might be useful to add to it a description of what DOE's responsibilities are under ESF 12, Emergency Support Function Number 12, where they have energy responsibilities in an emergency to help coordinate federal support and efforts. Now, that doesn't go so far as to say they should have a reserve of portable generators, but they do respond on behalf of the industry. The industry can ask DOE for help.

In the case of hurricanes, I know Hurricane Andrew, they organized the deployment of National Guard into Florida to help sort of keep the peace and keep folks from stealing chainsaws from the utility crews and things like that. So there is a function for DOE that already exists, and I think just acknowledging it in this paper would be useful to have it documented.

MR. COWART: In line with our conversation that we just went through, is that a single sentence fix that can easily be done today?

MR. NEVIUS: I think it's a single sentence with a link.

MR. COWART: Thank you. Bill, do you want to comment?

MR. BRYAN: Sure, just briefly. I want to comment on David's comment, and thank you very much for that comment and calling out our ESF 12 functions. That was actually that idea generated, frankly, with myself, looking at what -- you know, we're under the gun, frankly. All the ESFs and all the sector-specific agencies under the presidential directive to come up with -- brainstorm ideas for better mitigation and resiliency.

And when this nation shifted away from a protection focus of critical infrastructure to a resiliency focus back around the 2005, 2006 era, a lot of pressure has been put on all the sectors to actually document what efforts are you trying to work through to make your system, your sector more resilient to an all-hazards environment. So that's where that stemmed from.

So we'll continue to have ideas, they'll surface, they'll come to the top, and we'll throw

them out to you to take a look at and tell us if it makes sense. But I do appreciate the committee looking at that and providing your response to that.

MR. ROSENBAUM: If I may jump in on that, Bill. The way I would address Dave's comment, I used to work the emergency response stuff when I worked under Bill earlier in my thing. The ESF 12 responsibilities are laid out in detail in the national response framework. And the way I would address this comment in here is to reference that document that's online and approved by all the agencies to describe the responsibilities we have there, and that would be a quick one- sentence fix to your solution there.

MR. COWART: And as we move forward, just assume that that sentence is written and added today. Clark?

MR. GELLINGS: Just to be complete, we are in the process of demonstrating a recovery transformer substation size, DHS, EPRI, and CenterPoint Energy. Successful, by the way, so

far, but a ways to go. So if you want to make a quick reference to that with the completeness of the document, that would be good.

MR. COWART: Brad?

MR. ROBERTS: Brad Roberts, ESA. It just seems to me that this was a very specific proposal and a very specific recommendation and I don't think it needs to be modified or changed. It stands on it's own and the recommendation is not to do it.

MR. COWART: Mike?

MR. HEYECK: I just wanted to -- Brad, you're exactly right. This is a very specific question and what we intend to do with grid resiliency is actually in the next item which is asset life -- doing a survey of asset life and going back to and, in fact, enhancing the recommendation we made a year and a half ago. And that is as we replace assets in the next 10, 20, 30 years, we replace them in such a way that adds resiliency security, efficiency, and reliability in a better way and enhance capacity. And that's

the intent of the group. This was very narrow and specific.

MR. COWART: Are we ready for a motion? Rick?

MR. BOWEN: Yeah, I just had one comment and that was that I think this is a perfect example of what this group ought to be doing or this board ought to be doing, and that is if indeed -- I mean, it's okay for us to have a response which is a no or nothing because that is what we're intending to do here. It's not to always come out with -- I mean, clearly the DOE has plenty to work on. I don't think it should be this advisory board's responsibility to delegate up or delegate out additional work for you all. I think to the extent that the question's asked and answered, then I certainly appreciate the fact that that's what we're giving it. And the two guys will take it that way because I think that is what we're about and then, hopefully, that's helpful. And I personally would recommend we move forward with it, so so moved.

MR. COWART: Is there a second? Wanda? All right. Any further discussion?

All in favor of improving this document with a reference to the federal emergency -- department's emergency response obligations, just add it as a cross reference, say aye.

GROUP: Aye.

MR. COWART: Any opposition? All right. Unanimously adopted. Thank you very much.

MR. HEYECK: On the thread of resiliency, I wanted to have Clark Gellings talk about the EPRI-sponsored survey on asset life, and then I'll have a concluding statement for the committee.

MR. GELLINGS: Thanks. This is Clark Gellings from EPRI. I think we all recognize that there's only really modest information on the actual life of transmission and distribution equipment. I mean, there's a lot of folklore around this and there are some facts. It's an area of concern for all of us. Specifics would help a great deal for the community at large for

RND planning to do things like developing better maintenance guidelines and actually, in looking at equipment specifications for replacement of equipment down the road.

Now, when I joined the EAC earlier this summer, this discussion apparently was already underway and some material had been drafted. What I added to the discussion primarily was to suggest that EPRI's already got an effort somewhat underway. What we have at the moment is a workshop scheduled. Actually, we've gotten one of the Canadian utilities have stepped forward to encourage us to do this and a number of others have joined. We need to define what assets we want to look at, we need to craft this survey in a way that utilities see value in participating, we need their cooperation of course. If you know how we're structured, we also need their funding so that we can get it done.

I would suggest that given the effort that we've already started and from what I understand and I can easily be corrected here, the

difficulty that DOE might have in doing a survey of this type and collecting information, it's something that we can do, that we not take any action as an EAC with regard to some kind of a document surrounding asset life until we get a chance to see what the response is from the discussions we're going to have at our workshop. And yes, certainly we most welcome cooperation, collaboration in this regard, but I don't know that there's necessarily a specific action that we would suggest today. Mike?

MR. HEYECK: Yeah, there is going to be two tracks. One is the EPRI-sponsored and I know the industry, not only EPRI, but the North American Transmission Forum, NERC, there is activity now to capture the end of life assets. But as we thread this, that survey was to produce what that bow wave of need is in the next few decades. And as we replace those assets, is there a roll with DOE to help us develop guidelines to add as I mentioned, resiliency, reliability, efficiency, security to those assets as we

replace. Any comments?

MS. REDER: I would just say that I think that topic's one of the most important things that we could focus on. Clearly, there's going to be a lot of investment in the aging asset infrastructure going forward and to the extent that there's guidelines and the suggestions on how we can incorporate new technology and do it wiser in the future, I really that that's well worth our time going forward.

MR. HEYECK: And I'd encourage all the new members to join the Transmission Subcommittee to be able to address that.

MR. COWART: So that action step in front of us, Mike, is precisely what?

MR. HEYECK: There's no action step here, it was just an update.

MR. COWART: All right. So you're not proposing a specific action that you're asking for committee approval of?

MR. HEYECK: Correct. This would be something that might actually postdate March.

MR. COWART: Okay.

MR. HEYECK: We'll just keep apprised of the EPRI- sponsored events or any other industry sponsored events that attempts to survey aging assets. And I do have a concluding remark before we move on.

MR. COWART: Pat?

MS. HOFFMAN: I guess I have -- first of all, thank you very much, Mike, for all the work that you have done in the Transmission Subcommittee. I appreciate all your hard work. A couple of thoughts.

On the asset life, one of the things, if we can get some more value, might be to consider some of the work that folks are looking at in standardizing nomenclature for the assets and continuing to push standardization with respect to identification. One of the areas that we're looking at besides asset life is in management, really health of equipment. And one of the things is getting more aligned to predict a failure or where a piece of equipments getting to the point

that it may be at it's end of life.

So some concepts around that that we're looking at from a sensing, monitoring, kind of grip perspective might be valuable to include as a valuable package on this activity. The other thing is, as we move forward from the earlier conversation, is the data exchange. As we look for planning models or et cetera, if we can build the assets to where it's being -- build an asset database where it can feed into the models, that's something else that we can look at. I think that was a discussion that we started talking about yesterday, of if we can get this organized, let's do it once and do it for multiple values and purposes.

And then one thing that I'd like to talk to the Transmission Subcommittee on is we've talked about the EMS system and as you guys were having your conversation, I started thinking about, what is some of the prerequisites as we talk about next generation EMS? The thing I'm looking at is, are we far enough with the PMUs and

some of the reference points there to get to a next generation EMS? And that's a question that we want to make sure that we're successful in the building blocks. One of the things I want to go after are building blocks that will provide value to the industry in the future. So thank you.

MR. COWART: Mike?

MR. HEYECK: Comments are very well taken, but maybe Ralph Masiello has something to add on that.

MR. MASIELLO: Yeah, I'm sorry to prolong the conversation. Anecdotally, KEMA has a software product that's something like 50 U.S. utilities used to track asset condition, maintenance activity, condition assessment information with stuff in it from notes to infrared photographs, et cetera. And I bring it up because we're unable to make use of that to do work in developing improved methodologies or any analyses because of the proprietary nature of the data.

And all of the users of that software do

not want any of that information used in some broader report that gets in front of the regulatory process. And so there's a policy problem that says, best practices type information can't be used and disseminated for fear that an individual maintenance decision becomes subject to some legal process. Just for what it's worth, that's something that's part of the U.S. Environmental problem that could be addressed.

MR. HEYECK: Yeah, points well taken. I think that that is one of the impediments actually to capture asset life of a wonder of things. If you could take a picture of it, and I think Joe Walsh has taken pictures of several assets and given presentation on those, I think it's out there. But your points are well taken.

Regarding your comment on PMUs, PMUs are in an alternate space in a parallel universe. They talk to servers outside the of the EMS paradigm today. And that's good for one thing: It doesn't have to be cyber secure, it just talks and uncovers issues, but we need to put it back

into EMS. And again, that's a point well taken.

MR. BALL: This is just actually to respond to Ralph's comment. The type of issue you just raised about a place where people can discuss very practical issues and share practices, ask questions, and that's why we started the North American Transmission Forum, and so a place where those conversations can be had in a very practical manner, really so that all the members, all the various transmission owners can move each other to a greater level of operational excellence. But it is a challenge.

MR. HEYECK: We need to flesh out -- this is Mike Heyeck again. We need to flesh out our work plan for 2013 and grid resiliency is going to be one of the main threads as well as any follow-on on the technology front with EMS and power electronics. This isn't just me, there's many. And many on the subcommittee have done a whole lot of work to get to where we are today. And one of the mantras we've been using is, we need to focus on that which DOE can do even if

it's simply to convene. But this next generation EMS issue -- we've raised the issue, it's heightened, and it's very, very important, and if we don't address it in the next five years or so, we're going to have a problem operating the grid. So I'm really pleased with the Transmission Subcommittee. Thank you.

MR. COWART: Tom?

MR. SLOAN: Tom Sloan, and a question for Mike and Ralph. On your program, and I'm sure there are others out there, is there a role that we could play in -- again, with the DOE partnering with state legislator and commission organizations to provide a limited immunity for data sharing that goes to a federal agency?

MR. HEYECK: That's above my pay grade.

MR. SLOAN: You're no longer relevant.

MR. CURRY: I'm a lawyer in private practice. I'd love to see some of your (inaudible).

MR. SLOAN: Actually, we give them immunity for a variety of things already, I'm just

asking if this is one we need to be looking at.

MR. COWART: Thank you very much. And just let me add that I think the work of the subcommittee in the recent period has been really terrific and I want to congratulate you, Mike, and the subcommittee for what you've brought to us at this meeting.

We are at the time for our morning break, so let's -- if you look at the agenda, we've got about 15 minutes. Then we will come back at 9:45.

(Recess)

MR. COWART: Okay, folks, please take your seats. We need to get going. Elliot, will you round up whoever is in the foyer?

Our next segment concerns the work of the Storage Subcommittee and in particular the Storage Report which is a significant work item for the subcommittee and the full committee. And I'll turn it over to Ralph the chair of the subcommittee.

MR. MASIELLO: Where to start? As the

report notes in the introduction, this is a statutory requirement. So, if we don't get it submitted by year-end, I go to jail and Rich is on probation. (Laughter) More pragmatically, we'd like not to --

MR. COWART: I hope the transcripts reveals the laughter that accompanied that statement. (Laughter)

MR. MASIELLO: But it is a requirement on us and because of the size and the depth of the report, this took precedent over any whitepapers or other work that happened last year when we didn't have the requirement.

So, a number of people contributed large efforts to this. Tom Clark, the ICF staff, Brad wrote major sections of text, Gordon reviewed it really carefully and rewrote numerous sections for us. Unfortunately, in final handoff and getting corrections and some sloppiness got into it and I'm going to go through that this morning. But we're in the same situation as the other papers, but maybe a little more difficult.

To save us time this morning, I've summarized all the comments I've received, specific comments, and the resolution that's proposed. Because this will -- hopefully, we can get past a lot of the obvious things.

Number one, Table 2 is the summary of Arpa-e activities. It's three pages long and we propose to turn that into a single, condensed table because there is no point in putting a report to DOE material from the DOE website on DOE activities. And the Executive Summary is too long.

On page 21, there is a reference to an ongoing process in California where the CPUC made a conditional decision on PPAs for Southern Cal Edison about concentrating solar thermal. And what really happened is the CPUC, in essence, said we're not going to approve the ones that don't have thermal storage and we will conditionally continue the process towards approval for the ones that do. The way it's written it doesn't come across clearly so that'll be rewritten.

Page 25 has got, among the different project examples, a discussion of an application to LIPA from AES for storage in response to an RFP LIPA has out for generation, really for congestion relief. So, we're going to double check that that is correct current status from the time this was written. Pardon? Somebody?

MR. ROBERTS: There's the guy right there.

MR. MASIELLO: What, Brad?

MR. ROBERTS: Well, Chris is the --

MR. MASIELLO: Yeah, Chris and I have been discussing that.

MR. ROBERTS: Okay, all right.

MR. SHELTON: Yeah, I think the -- it just needs to be checked for accuracy to the current status.

MR. MASIELLO: Yeah, we didn't have access to Chris before now.

Okay, page 35 and 57 make a reference to FERC 1,000. It should be to an open NOPR. We'll get the right identification of the NOPR in there.

Page 55 is a cut-and-paste issue where there's a paragraph that doesn't flow correctly and makes the following bullets unclear and we just delete -- the paragraph should have been deleted. Similar issues in 56 and 62 to 63.

In page 64 is a substantive change that Sonny brought to our attention. And 64 deals with the -- there's a comment in there that basically says people are afraid to invest in storage because if it fails prematurely, in retrospect, a regulatory disallowance of the investment could be allowed. And the way it was worded didn't work, let's say, and Sonny gave us wording that corrects it.

So, any other factual corrections or inconsistencies people have discussed we should go through this morning. What I'd like to do, though, is look at the conclusions and recommendations to start the discussion.

So, you know, if you step back from the report and look at what's in it, there's a discussion of state-of-the-art applications of

storage in Section 2. And some conclusions about that, that basically say storage is viable in some applications today. And the evidence for that is private investors are going off and doing things with their own money without incentives or federal support, in particular regulation services and restructured markets and use of storage in renewables integration in situations where there aren't economical conventional generational alternatives. And there are examples in the report of that.

In other applications we're still challenged by the economics or by lack of understanding or uncertainty. But the committee report says the benefits for capacity factor improvement, reliability emissions, renewable integration, are still potentially significant, but the case has yet to be completely proved.

And then a number of barriers to adoption are identified and described at length, one of which is worth taking a look at. ESA conducted a survey of state regulatory and

legislative bodies for us. Really what happened, forgive me, David, is the Paperwork Reduction Act made it impossible for this committee to directly conduct a survey. So, Tom, wearing his hat as legislator, and Brad, wearing his hat as ESA chairman, organized the survey and went to NARUC and other meetings. Correct, Tom? And introduced the survey; ESA collected the responses. The subcommittee drafted the assessment of those responses, put the results in as an appendix, and ESA has now put this on their website, I think almost verbatim as it appears in the report.

MR. ROBERTS: ESA has put out a report on the findings of the surveys.

MR. MASIELLO: Yeah, and it looks word for word, I think, what's in the appendix. There are a couple of conclusions from that that are headlined. First is the state bodies are saying we don't have any information. We need to learn more before we can deal with it, and pretty conclusively.

And second, for DOE's consideration,

these people are saying webinars and conferences and publications are not the way to communicate to us. Now, this is kind of hard, but they are saying come conduct a workshop for our staff and our offices and take the time. So, that found its way into the recommendations, as difficult as it may be.

The short-term recommendations show up in the Executive Summary and again in the Recommendations section. Some history to this, in 2008, the first report recommended that DOE conduct a study into the genome of storage and the idea here originated with Donald Sadoway at MIT. He said, you can go look at the electrochemical potential of all sorts of combinations in the periodic table and assess what the potential electrotechnical benefits could be, meaning the energy density per pound, for instance. And he had examples. So that report said go off and pursue the idea.

Out of that there is a current project by Arpa-e. Now, granted, the thrust of that

project isn't exactly the DNA of the periodic table, but it addresses it as part of its function. So the recommendation is continue that.

A second recommendation is that more detailed studies of how storage plays into the high renewable penetration scenarios being examined are needed. And the origin of this is most of the regional studies on future RPS scenarios, wind integration studies and the like, didn't look at storage explicitly at the time they were done. The PJM study underway more explicitly factors this in, but others before that have not. So, that's a recommendation.

The EISA established a number of technology research hubs and there is an active procurement underway for the storage hub, we believe, where RFP's app proposals have been submitted and the recommendation is to go ahead and fund one. Complete the process and fund one.

Another recommendation is to publicize the storage technology roadmap. This was discussed last year with DOE and what the path is

to get technologies from research stage to commercially viable and then, per that roadmap, to continue funding demonstration projects. So, those would be recommendations, i.e., for next year.

Medium term, look in more depth at what high photovoltaic and electric vehicle penetrations can mean, including field measurements and analysis in pockets of high penetration. Continue with what comes out of the materials genome effort. Research on storage longevity is needed because one of the big barriers to adoption is how long does it last, what the depreciation schedules look like.

A novel idea not in prior discussions is to look at what the transportation sector outside cars means to the grid in terms of storage use, so buses, trucks, rail, et cetera. If they are pure hybrids that don't plug into the grid, no issue, but if they potentially have to be charged in bus terminals, for instance, this is an impact. Per the study of regulators and legislators conduct

the outreach that's basically requested by those bodies and still more work on emission impacts of storage and ancillaries and renewable integration.

So that's what is in the report and the things that we know have to be fixed in the next version. We didn't put out incremental versions the past two weeks because we saw no point in flooding you with 70 page documents. With that, Richard, open for discussion.

MR. COWART: Comments, questions about this report? Paul.

MR. CENTOLELLA: Paul Centolella. I guess, you know, and I'm not on the subcommittees, so I, you know, I have not -- I was looking at the October 1st draft and, you know, have not been part of the discussions that have led to this. A few things that occurred to me as I reviewed it.

First of all, you reference the Genome Project as being REACT. As I look at REACT in the Arpa-e framework it's about magnets and motors as opposed to about, you know, genome about storage. And there are at least -- well, depending on how

you count them -- you know, six other Arpa-e programs that in some way relate to storage and are not specifically called out.

And I guess I'd like to get a clearer reference to where the genome work is going on and, you know, some discussion of how these other Arpa-e programs fit into the roadmap. Because I think going forward, one of the things that will be important to support is, you know, is what the advanced research on both storage chemistry and storage technologies are going forward. And I saw this report as being a lot more about, you know, here are the existing storage technologies that we have and let's figure out how to, you know, where they are cost effective and how to deploy them.

When, in fact, I think, one of the most exciting areas is what's happening in some of the advanced research on storage that, you know, maybe didn't get -- it got in the table that you mentioned but didn't get as much emphasis perhaps. And, you know, the one reference, one specific reference to an Arpa-e program doesn't seem to

exactly correlate with the way Arpa-e describes that program. So, that was an area where I thought there needed to be some further development.

I also noted that there were, you know, occasional differences between the recommendations in the Executive Summary and the recommendations at the end of the report. In particular, I think the Executive Summary calls out specifically the funding of the hub. And it doesn't appear at the end of the report, I don't believe, or at least I didn't see it there.

MR. MASIELLO: The Executive Summary was intended to be a condensation of what is in Section 6.

MR. CENTOLELLA: So, I just, you know, ask you to look at that and make sure that you're being consistent there.

I guess my next comment is maybe one about scope. And I'm not necessarily saying that you should expand the scope, but I think you need to be clear about the implications of the scope

that you've drawn. So, if I look at the electric system today and particularly look at the opportunities at an end-use level where there are many end uses that have either thermal inertia associated with them or scheduling flexibility associated with them, this represents an implicit, potentially very low cost kind of storage that we're not taking advantage of on the grid now.

I think it's a very important near-term opportunity for DOE to do some things in that area. Not conventional kinds of storage technology, but perhaps ought to be noted as an area of future focus where there are really important near- term opportunities that DOE could reach by it's convening authority in some very valuable and rapid ways. And if you're not going to address that, you should at least point out that this is an additional area that DOE might want to consider.

MR. MASIELLO: Paul, I don't want to get into a back and forth defending it, but on page 45 there's an extensive discussion of thermal

storage. And again later in the report it talks about hot water heaters and soft pedals that because of the contentious issue over efficiency standards shrinking hot water heaters at the same time as thermal masses (inaudible).

MR. CENTOLELLA: I understand that issue and so I kind of brought this up because there are places where you seem to say, well, we're not going to deal with this and describing scope and then there are other places where you sort of deal with it in partial ways. And I just -- you ought to be clear about what you're doing and what you're not doing.

MR. MASIELLO: We made a conscious decision to not talk about whole varieties of end-use storage, you know, other than the section on portable power that notes it's going on and not talk about fuel storage, for instance. So, but we certainly could add language that says more nontraditional, nonelectrical storage is what you're saying, right?

MR. CENTOLELLA: Yes, yes. And there

are real opportunities to take advantage of things there, you know. And just, you know, I didn't want it to sort of get lost in between being partially dealt with and at other points seemingly to say this is outside the scope of the report.

MR. MASIELLO: Right.

MR. CENTOLELLA: And I guess my final comment here is there are specific recommendations about, you know, funding for demonstrations. And, you know, that's all well and good. I think it would be -- may be helpful to have some thought in the report about exactly what type and nature of demonstration you're looking for, what criteria the department should be looking at. I mean, just saying we should put more money doesn't necessarily tell, you know, either the department or Congress --

MR. MASIELLO: I don't think the group is in a position to say here are the winners and losers. Right? We're saying instead publish the roadmap and move down the roadmap.

MR. CENTOLELLA: Okay.

MR. MASIELLO: And you'll notice, for instance, there's a table in there and here's the state of technologies in the market. And it points out a technology that was very popular a couple of years ago, is on hold right now until the causes of fire in the field are understood and corrected for. Right? That was the leading bulk storage technology being bought commercially in thousands of megawatts and now it's on hold. So, I think, for us to say this is the right thing to go do as opposed to publish a roadmap and then follow it, that was our thought.

MR. CENTOLELLA: I think that's fine. It's just -- you know, so I noticed at one point in the discussion of demonstrations it says, well, demonstrations following the roadmap discussed in Section 4, but Section 4 is on other government activities. So, you know, it was just not clear how you were getting to looking at exactly how -- what it was that were the demonstrations or the nature of the demonstrations or the criteria for the demonstrations that you were suggesting

funding for. So, another area with just some clean-up and some consistency is needed.

MR. COWART: Sonny?

MR. POPOWSKY: Yeah, thanks, Rich, and thanks, Ralph. I just want to mention in the list of the changes you made, a couple of them were ones that I had recommended. Actually, there were three of them and I think you caught two but not the third one.

There was another one and I don't think it's at all, you know, essential to the paper. It was just a reference on page 56 to decoupling, which I thought inaccurately described the impact of decoupling. I think either with or without decoupling, it's always within the utility's best interest to operate efficiently. And I think there is a sense at the bottom of the page that suggests that it's not. I think I sent that to you, it's right before the end of the page.

MR. MASIELLO: Yeah.

MR. POPOWSKY: I would just delete that sentence. I don't think it's --

MR. MASIELLO: It doesn't say -- well, all right. The simple thing to do is delete that.

MR. COWART: For what it's worth, Ralph, I agree with the point.

MR. MASIELLO: Yeah, a lot of us would agree with that point.

MR. COWART: No, I mean, I agree with Sonny's point that the -- we would not want to suggest that the throughput incentive is the same thing as using equipment efficiently or storage. It's just a different thing.

MR. MASIELLO: Okay. Sentence struck.

MR. COWART: Okay. David and then Wanda.

MR. NEVIUS: Dave Nevius, NERC. Ralph, I was wondering in the context not just of this paper, but some of the other papers that we've talked about earlier, if it would be worthwhile, at least, mentioning the other activity, like EMS Systems. Because in EMS Systems we talked about the need to have an architecture where you can model storage. And in the non-wire solution paper

we talk about how various non-wire options should be considered in lieu of transmission. So just some cross-links between the different papers. I don't know when they're all going to arrive at the secretary's desk, but tying them together possibly would be helpful.

MR. MASIELLO: Cross-links are the ones that were approved today, that are approved as of this meeting, let's say.

MS. REDER: Wanda Reder. Ralph, just a good piece of work. In fact, I think this document establishes such a strong foundation of the status that it can be used for a lot of other purposes.

The one thing that I wanted to call the attention to is that survey. As I think about the activity across the subcommittees, often we have a recommendation that bubbles to the top on DOE's interaction with the states and trying to make that meaningful and impactful. And I think that survey, while it's embedded into the appendix of the storage report, it can really be leveraged

across a lot of fronts. Because there's some really good information in there and how to communicate, what to communicate to effectively connect with that audience. So I just want to make sure that that gets elevated and gets the appropriate attention.

MR. MASIELLO: Yeah, that's one template for how this group can get work like that done. Right? Leverage some other organization that can actually do the work. It solves legal problems and it solves research problems and it solves the willingness of the target people to respond to you, all those things. Had we approached state bodies as a DOE committee, we probably would have run into some resistance to answer the questionnaire, for instance. So, it worked.

MS. REDER: Yeah, it worked.

MR. MASIELLO: With, you know, a lot of effort from people, a couple of people flying to meetings and stuff.

MS. REDER: Can you just double check that typo, that megawatt for Predidio. It think

it's four instead of five, but we can work that.

MR. MASIELLO: Yeah, I got the information from AEP.

MS. REDER: It should be four.

MR. MASIELLO: Okay.

MR. COWART: Paul?

MR. HUDSON: Ralph, just a parochial point. On page you mentioned a statute that passed in the Texas legislature. And you carry on to talk about the administrative rules that passed. There have also been revisions to ERCOT protocol and to the operating guides at ERCOT that I think are worth noting.

And then back on page 46, when you're talking about government activities, you mention a specific docket in Texas that's laying fallow. And the reason it's laying fallow is because of the activity that you mention up on page 8. And I'm just thinking perhaps you could carry forward the information on page 8 back into the more specific government activities description that you have back on page 46.

MR. MASIELLO: Okay. Yeah, we couldn't address 50 states, right? And so the ones you pick, then you run into the risk of how will the mention be perceived.

MR. COWART: Tom and then Pat.

MR. SLOAN: Tom Sloan. I want to reference the ESA survey also because I want to point out that one of the strongest, from my perspective, recommendations to the DOE is that there's a question that I'd asked: What are your most trusted sources of information? And it's the national labs and federal agencies. So, you know, as a body in this subcommittee report and the others encourage the Department of Energy to reach out and provide information it's a two-way street. Because one of the things that the respondents also said was they don't necessarily know what they don't know. And so, again, I think the ESA work -- and I commend Brad for making it possible -- you know, can be invaluable to us and to the department.

MR. MASIELLO: Yeah, should the report

emphasize that more? Gee, the states really like and trust DOE more than they trust manufacturers, consultants, and utilities and developers. That was the message. Right?

MS. HOFFMAN: I just wanted to emphasize a couple points. I think Dave Nevius brought up the importance of adding storage to some existing tools and applications, and that's extremely important. I think the importance of sharing data and getting, you know, basic standards around the data that's shared over time with respect to the performance of energy storage devices are critical, you know, given your earlier conversation as well as the benefits analysis as we continue to look at that because that's going to be how we move things forward.

And I go back to an earlier conversation on optimizing the system. PNNL did a study they came out in June on the Western Interconnect and I kind of parallel these reports. I'm looking at that one so I wanted your thoughts at some point in time on the PNNL study and the phase one WECC

study as well.

MR. MASIELLO: Okay.

MR. COWART: I'm going to call on myself.

(Laughter)

MR. MASIELLO: Are there specific things you'd like the report to address from those comments? You know, it does talk about specific needs for analytics against particular storage applications. Right? You know, it calls out the distribution system. Today you can't model storage or assess it. And this precludes utilities from doing anything about it, if you will. Right?

MS. HOFFMAN: I didn't have any specific changes.

MR. MASIELLO: Okay. Thank you.

MR. COWAN: Ralph, I also want to echo a comment that Paul made about thermal storage and the use of smart charging and other techniques to take advantage of variable resources and to deal with, frankly, many of the same concerns that

grid-to-grid storage is meant to address. It's clearly not the theme of this paper and I understand that. But I think right up in the introduction where you're talking about storing gasoline and gas tanks or what have you, you need a couple of sentences that acknowledge that the practical availability of storage, thermal storage, and hot water heaters in buildings, in the timing of charging vehicles, or in ice making or what have you, is at least as large as the total quantity of existing storage on the grid today, existing grid-to-grid storage.

MR. MASIELLO: Yeah. Help me out, fellow drafters. I think we had a discussion and where we sit there is a difference between demand response and storage. Right? And quite a few building thermal storage applications, you know, we felt were more existing DR than are energy storage per se. There's a fine line there.

MR. COWAN: Well, I think there is a distinction between straight demand response, which is interruptible load if you want to, in

traditional terms, and timed use of electricity on the grid in order to defer the need for electricity later. So, sure there is a difference, but we heard from PJM that they calculated that the capacity of hot water heaters on the PJM system to absorb variable load and defer peak is at least as large as their entire pumped hydro system.

So, and the same thing is true in many other systems. I just think it's a mistake for us to focus entirely on grid-to-grid electricity in electricity out-storage without mentioning that the opportunities to use timing and thermal storage are also very large. It's not -- we don't need to hijack this report into that direction. We just need to note it.

MR. MASIELLO: Since we got the discussion going. If you pre-cool a building at 3 a.m., you're putting energy into the building that you can take back out by turning the AC off at 2 p.m., so that's storage. But if you turn off the hot water heater and let it turn back on, that

isn't storage, that's demand response, okay? If we had a way to tell the hot water heater raise the temperature of the hot water 10 degrees temporarily, then it would be storage. And that was a distinction we talked about. We didn't explicitly write it that way, though.

MR. GELLINGS: And the other thing -- Clark Gellings from EPRI -- and the other thing that we debated was just how far do you go with this. Because if you embed phase change materials into wallboard, for example, and change the thermal integrity of the building, that's energy storage in some sense. So, we thought we'd stay with the as close to the electrical side as we could.

MR. MASIELLO: Yeah, our translation has got to be fungible electrically to the grid. Right? If your changing the use of energy over time, but you can't get electricity back to the grid, that was how we chose to define it.

MR. COWAN: I guess I'm agreeing that that's how this report is written. But if it's

intended to be useful to decision makers, it's useful to say right up front that there are these other techniques that we're not talking about in this paper.

MR. SLOAN: On that point, as one of the drafters, I think part of the discussion you're raising, Rich, is more in the realm of the smart grids, smart meters, and the customer interaction, you know, their voluntary or involuntary price or price-driven, you know, response to signals. And, you know, I have no objection to inserting a sentence or two that references these other opportunities, but I would tie them to the customer response as opposed to the technology or the utilities behavior.

MR. COWAN: Paul can go next.

MR. CENTOLELLA: Paul Centolella. So, I think there is an actually very large opportunity out here that has to do with, you know, really very inexpensive ways of enabling a whole set of end-use devices to see and to be able to respond to differences between current interval and

indicative forward interval price signals. It includes not just water heaters and pre-cooling buildings, though those are important aspects, you know, it includes basically a lot of thermal loads. It includes a lot of loads that have flexibility in terms of when they draw power: Pumping loads, charging loads, a number of other energy services that from a customer perspective, the customer is really indifferent about when the power draw occurs. And each of these, you know, is really a matter of optimizing when the draw occurs on the power system. It is, in effect, a kind of storage in the sense that you are shifting when the electricity demand occurs rather than simply reducing demand on peak.

And there is, I think, a real opportunity to both do this kind of demand optimization relatively soon and lot of interest on the part of device manufacturers. And frankly, if we do it, changes the consumer engagement equation, you know, in significant ways. And it's something that, you know, I don't know that you

can get into it at this point in this report. But at a minimum, I think, you need to call this out as something that, you know, is an area of further work that, you know, should be undertaken and is, you know, is at least on the boundary between storage and engaging devices and homes and businesses.

MR. MASIELLO: What if we were to do this -- because, you know, no one disagrees with what you're saying, I don't think. But it isn't part of DOE's storage program. It's somewhere else, right? And it could be for the EAC. It's more smart for it than storage. But what might be really valid is where we recommend that more detailed analysis when we do these high RPS integrations scenarios, et cetera. And we say include storage, right? We ought to say and demand response and time-shifting attributes of demand response. You know, some of those applications aren't time-shifting, they are just used less, right? What matters is if the application has a payback because of thermal mass.

Right?

MR. CENTOLELLA: Yeah, so I guess I've tried in some of the things I've written recently to sort of distinguish between demand response, the way we've conventionally thought of it, which is largely let's just reduce demand on peak, and demand optimization, which is really let's give the right signals to end-use devices so that they can decide when it's most efficient for them to be operating. Because I don't want to confuse people by just saying demand response as we've come to think of that as, okay, we're just going to cut peak load, which is a different item.

MR. COWAN: So, I guess the question on this point is recognizing that it's not the focus of this report. Can we include a sentence at the beginning where we note that thermal storage and demand optimization are techniques that allow us to deal with the problems that are mentioned in the beginning, which is the variability of renewable resources and what have you?

MR. MASIELLO: It adds some of the same

--

MR. COWAN: Just a sentence that says that and then drops a footnote that says that's not the subject of this report would satisfy the concern that I'm raising anyway.

MR. SHELTON: Chris Shelton, AES Energy Storage. I haven't had the opportunity to work on this report. I'm new, this is my first meeting. I just want to -- one way I think to think about this debate that's been going on is that it's very much focused on an application or meeting the need of, you know, shaping the load, which is a primary activity that we think of as the grid-to-grid storage performing. It's one of the main activities, but it's not the only one. So, I just want to make sure that as we make this clarification we don't substitute some of the other activities mentioned for all of the services that grid-to-grid storage, for instance a pumped hydro facility, could provide. Right? They're not equal in their capability set.

MR. MASIELLO: You know, at the risk of

provoking more discussion, the most controversial stuff in the report didn't draw any comments, except one from Susan, and that's the discussion that leads to the recommendation here where it says research into incentive and risk mitigation because the group identified technology risk as one of the biggest obstacles, meaning people are worried about will it not last long enough. Will it not work as advertised? Right.

And tax incentives and rebates reduce the costs but they don't do a thing for the risk. So, Tom drafted some material on it and serious back and forth on this that led to, on page 56, the discussion of alternative risk mitigations strategies to be looked at, some of which come from other domains that are kind of novel to the energy, electric power sector one way or another.

And there hasn't been any discussion about it. Susan pushed back and said, oh, you can't say we should just up viability standards across the board. And so, fine, we'll take that one out judiciously. But the others' different

financial products, et cetera, are there as things to be explored. You know, knowing the controversy we had internally about this, I just thought make sure everybody sees it. Speak now or --

MR. VAN WELIE: So guess who was on the other side of this conversation? I'm fine with the way it's written. I don't have a problem with doing the research and thinking about this problem. My issue was something different.

MR. MASIELLO: No, I understand that. I was just seeing if you could add to the discussion. We spent a lot of time on that. No comments? Okay.

MR. SLOAN: Tom Sloan. If the discussions are finished, I'd move that we recommend with the changes that are noted on the screens and were in our discussion.

MR. COWAN: Is there a second?

MR. GELLINGS: Second.

MR. COWAN: All right. You have that? Second by Billy Ball.

MR. BALL: No.

MR. COWAN: Oh, it wasn't you? Oh sorry, Clark, sorry.

MR. GELLINGS: I'm glad (inaudible). (Laughter) Any further discussion?

MR. CENTOLELLA: I guess I would like to see a revised draft that integrates all of this before saying that we're together on this. I think the discussion has included, well, A, you've put up a number of changes that you plan to make and we've had some substantive discussion.

MR. MASIELLO: Right.

MR. CENTOLELLA: And so, I'm not quite sure we're in the same place we were as some of the other reports.

MS. KELLY: Can I say something? I just want to remind everyone from what I heard of the procedural discussion this morning that if we do that, we have to put it in a Federal Register, we have to notice it, we have to go through all that, and this report is due by statute at the end of the year. So, I just point that out.

MR. COWAN: Any other input on Paul's

request? I think we should deal with the -- it seems to me procedurally, in terms of voting on accepting the report that we have the two options: One is to, in essence, approve the report with a concise list of bulleted changes that will be made to it and that we understand. Option one. Option two is recommend that the report be amended and resubmitted, however, whatever the process is required to do that. And there are two ways to deal with that procedurally: One is to basically take Paul's observation as an amendment, vote on the amendment, see whether we want to do that and then vote on the report; or simply to take Paul's recommendations as a recommendation to vote no. Lauren?

MS. AZAR: I'm trying to negotiate right now option three, which is Paul come up with some recommended changes over the lunch hour and bring them back to the group so that we have something by the end of the day.

MR. COWART: Okay.

MR. ROBERTS: That was going to be my

comment as well.

MR. COWAN: Is there any prospect?

MR. CENTOLELLA: I'm perfectly willing to try to work with Ralph over the lunch hour. I will be optimistic and say we can try to do something.

MR. COWAN: And in which case this decision can be deferred until after we see whether or not that accommodation can be reached.

MR. MASIELLO: You know, out of curiosity how many people were able to read the entire thing carefully? Half? I don't know how that factors into the process.

MR. COWAN: I'm not sure that it does actually. I think a member has raised concerns and we need to address them.

MR. MASIELLO: Oh, yeah.

MR. COWAN: And we address them by amending the report or we vote.

MR. MASIELLO: I think the reason I said that is there is too much material there to discuss the entire thing page by page, you know

what I mean? And a substantial number of people have not had time to read it carefully, we might want to reflect on that. You know, we'd like to see it finally submitted with a unanimous approval and, you know, I don't feel comfortable asking people who have not read it to give us that. And I'm not complaining because it was only out two weeks ago, but there it is, right.

MR. COWAN: Let me suggest that we defer the pending vote until after there has been an opportunity to see whether we can come up with a unanimous recommendation. I think that will work. Yes, Gordon?

MR. VAN WELIE: And if anyone else has a concern they should be speaking to Ralph over lunch as well.

MR. COWAN: We're going to have a drafting session over lunch and just to make sure that if we're going to adopt a report with a unanimous recommendation that everybody's had an opportunity to either see the bullets and know that a change will be made or to suggest precise

language, which makes sense to me.

SPEAKER: (inaudible) is available for a meeting.

MR. COWAN: That's a good idea, we will do the drafting session in the California Room. I think there's a reasonable prospect of success today, but, we'll see.

Any other comments on this issue right now? All right, the vote is pending and we'll deal with it after lunch. Thanks very much, Ralph. Thanks for the work. Commissioner LaFleur, as usual, we're happy to have you with us and we're also happy to hear your report.

MS. LAFLEUR: Well, I'm happy to be here. Very interesting discussion this morning. Usually I say, well, I know we're behind, so I'll try to let you make up some time, but I don't know if I should say I'll try to fill some time. When I saw the agenda and it said Special Topics, all I could think of was the old church lady on Saturday Night Live, "Isn't that special?" FERC is working. What I thought I would do is try to just

cover a few things that are in progress at the Commission and, hopefully, that will spur some discussion, and obviously I'm happy to, as always, take questions, whether they relate to what I talk about or not, if they relate to what we're doing.

First, I wanted to mention, I guess you had Joe McClelland here yesterday, but then you're probably all caught up on this, but we did announce last month the chairman has set up a new office at the Commission, the Office of Energy Infrastructure Security. As I understand it, it's like a focus center of excellence to work on some of the emerging issues. I've drawn the analogy it's a little bit like, for those of you who are close to the Commission and know we have an Office of Energy Policy Innovation, and then we have the rate and whatever it stands for, OEMR, Energy Market Regulation, that cranks all the orders. This is to be like a think tank like that for reliability, and I appreciate you all inviting Joe, and I think that's a resource for future meetings on some of these topics.

I wanted to start by just going through several cases that are on the Sunshine Act agenda for Thursday. Some of you probably, actually, look at the Sunshine Act agenda when it comes out. I'm sure many of you do not. You're too busy in your own day jobs. I'm hoping I won't jinx these cases by mentioning them because those of you who are close observers know sometimes things do drop off the agenda. Sometimes before we put it out, as you see those omitted, which is one of my pet peeves, why don't we just renumber them? But I've been unable to make that process improvement, but sometimes they drop off between when they're announced and the agenda. But we do have a couple, I think, significant -- first starting with reliability, a couple significant reliability items noticed on the Sunshine Act agenda. We propose to take up the Vegetation Management Standard that was, I think, a four-year drafting effort by the industry, and one of the first, if not the first, results-based standards that NERC and the industry have put forth, which is kind of

a concrete results-based test rather than all the standards of the leading indicators that go into that result, if I understand what a results-based standard is, if I said that right. That is on the agenda, and of course, in my mind that exemplifies kind of the blocking and tackling part of reliability. Nothing is more basic than trimming trees.

Also on the agenda, and has gotten a little bit more buzz, is taking up next steps of geomagnetic disturbances following on our technical conference of April 30. We've been trying to distill the comments we got before, at, and after the conference and figure out what to do next. I won't steal our thunder for Thursday to the extent there is any, but I've been, certainly, a strong advocate, myself, of cutting through the technical debates about geomagnetic disturbances. I know I've talked about it, I think, at this meeting before. There are debates about in what way solar storms might have an impact on the bulk electric system, whether it would be through

reactive power breaking up the grid, or whether it would be, if I understand my electricity right, inductive power damaging high-voltage transformers or some combination of the two. I've been a strong advocate of figuring out what the no-regret strategies are and getting started on them.

I just want to acknowledge that anything we do in this area, perhaps even more than all the other reliability standards or than some of them, is by its very nature quite complex because the grid is a complicated thing, different in different places, different geographies, and so forth. But as I've said before and I'll say again, I think the fact that it's going to take a long, long time to tackle this is not an excuse to put off starting. Rather, it's a reason to start starting, so we can start thinking about it. So, that's there for Thursday.

And, hopefully, also on Thursday, we have the re-hearing of Order 1000-A. I guess this is my first multiple-letter notice, a rule I will have worked on, but the issues that were teed up,

and this is -- so we did 1000 last July, then the re-hearing within the last few months sometime. The issues that are teed up relate to Section 217 before the Federal Power Act. The special protections for load-serving entities, there was a concern that we muddled that in 1000-A. A number of folks came in and filed asking for clarification, and also some applications, primarily from Southeast Power Pool Region and MISO on the local definition and the local exception to the ROVER and how it overlapped and cost allocation. That's pending. I realize that we also have Compliance already coming in as I'll come onto in a minute, but nonetheless, that's on the agenda.

And also on the agenda is the Southwest Power Pool Day 2 Energy -- Day 2, I don't know why I said that -- day ahead in real time energy market that they propose, I believe, to start in early- ish 2014. That's a significant addition to the market community that they're in the process of undertaking.

I want to talk a little bit on the agenda. That for this meeting, it said filings in or filings complete or something like that on a -- regional planning filings complete major milestones on Order 1000. They're not actually complete, but we've passed some major milestones. I, hopefully, this isn't too geeky to be of interest, but since I didn't know this, I'm sure most of you don't know what's in and what's not in.

We did get about 12 filings in last week. All the Western parties: West Connect, Northern Tier, Columbia Grid, and the California ISO filed. In the East: Florida; North Carolina Transmission Planning Collaborative, South Carolina; Maine Public Service, that little northern piece of Maine that's not in ISO New England; New York ISO. And PGM filed its cost allocation portion only; and in central, MAP, I believe that stands for Mid-American; and some of the MISO individual entities filed. So, those are in, and I believe -- I don't think I'm talking out

of school. I think we noticed them for comment, or we'll get comment, anyway. We're anticipating that folks will come in and comment on ones that come in.

Next week, a big week, we'll be hearing from ISO New England, MISO itself, and PJM, the non-cost allocation piece. And then in two weeks, SPP. And then coming on early next year, MANAL. I think that's Manitoba, Alberta. And the whole Southeastern conglomeration of Southern -- Louisville Gas and Electric and other -- some of the municipals that are planning with them, and East Kentucky are all early next year, and then they will be complete.

We've doing a banner business in meeting with people who want to have pre-filing meetings before they file. Those have been enormously helpful and for those who may not have filed yet or may not have had a pre-filing meeting yet that might be filing in the future, I do urge you to, yourself or whoever does FERC for you, to take the time to do that. We've also had meetings with

others who were involved in the process, letting us know some early issues that they see. I have not looked at any of the filings that came in, so my summary I'm about to give of some of the issues I think we'll be confronting are based on pre-filing meetings and comments I've heard from people before.

But I think on the planning side, I think the public policy requirements and particularly the role of the state's various of the groups have come in with proposals of how to use their state parties or how states can do things together, particularly to identify transmission needs driven by state public policy requirements. And I think that's going to be where a lot of the action is on compliance, because we have some different nuances of filing from the different regions, and then others disagreeing with that way of doing it, which is why we get to be popular and make nobody happy because people always disagree, but that's what you would expect on something important.

An issue that was teed up here earlier this morning -- I call it non-transmission alternatives, but apparently it has a new name, non-wire solutions, but that, I think, is very much in play in some of the regions. It wasn't particularly changed in my mind in Order 1000 from Order 890, but I think the stakes were heightened in some ways, so that looking back at what we do in Order 890 and how it works is on the docket. I've said before, in speeches before seeing any of the filings that come in, I do not, at least in my own mind, see Order 1000 as a federal integrated resource management where we cost allocate and plan everything and take it away from the states. First of all, I have scarring, searing experiences with integrated resource management already, but secondly, I think a lot of these issues, especially the non-transmission alternatives, have huge state aspects. But be that as it may, I think a lot of that's going to be teed up in the filings on these state versus federal policy.

The other big gestalt is changes to the

right of first refusal. There's some legal issues teed up acutely in New England and/or they've been very much on it. I think New England wins the prize for most pre-filing meetings. We heard from seven different sets of parties on the New England discussions, and I first thought it might be just me, like they're lavishing special attention on me. But no, they've been around the floor, so. (Laughter) But some of the legal issues are, in varying ways, raised in other regions as well. But then there are, I'll call them practical issues raised of to the extent there's not a legal issue with changing the right of first refusal, how long does it take to change? How far ahead? How long will it take to bid out projects and so forth? That's being teed up in a lot of the filings, and they've made various proposals for phase-ins, none of which are high church Order 1000, and they'll be a lot of action, I think, in interpreting it as we move forward.

And then, I guess, I sometimes think the word "policy" is overused, but there are still

policy issues with the right of first refusal and how it relates to reliability. I had given a lot of thought to that when we voted out the initial rule in the reliability backstop, ways to assure that we didn't undercut local reliability needs and obligations to serve in imposing a regional process. It strongly appears that we might not have pleased people because those still continue to come up and come up and come up, and I think we'll be dealing with those on compliance.

So, those are the big issues that I see, really, unless there might be surprises when we read and get reports on what came in, but those are the issues that have been teed up in the discussions so far. And this will be new for me. I guess I was around, obviously, when we did Order 745 in which I think we still have one outstanding, but this is a -- I was not around on the Commission when they did things like Order 88-A, so I think they'll be -- it's a body of work for us in sequencing and how we can get them out in a timely way so one informs the next and so

forth. And until they're all in, I don't think that's even in prospect, but that's our next step. It's all about kind of -- and there's a big kind of macro issue of how much regional flexibility to give and when flexibility actually undercuts the principles versus this flexibility within the principles.

So, that's what I was going to say on that. I'm happy to take questions.

Just two other things that aren't on the agenda but are very much on our work docket. Want to just mention transmission incentives. I have seared in my mind Sue Kelly's voice at NARUC saying, I believe you said, I wake up every day and think this may be the day when FERC takes action. I can't -- that was like -- I can't say that I wake up every day and think this might be the day, but I do think of it every month when we put out another agenda. (Laughter) But we are voting out incentive cases and grappling with some of the issues, and we do very much have next steps on the Notice of Inquiry on our work list. We're

actively working on it.

Another thing actively on our work list, although not on this month's agenda, is gas/electric interdependency, which I think I also talked about at this forum. We did have our five regional technical conferences in August. I went to three, listened to one, led the other. I thought they went well. It seems like it's every other thing FERC ever touches, and probably that state commissions touch as well, a mix between reactive and proactive. What are we going to wait for people to file with us, and then respond, and when do we see a trend? And so, we do something proactively, and everyone says, oh, FERC, you're crazy. So we back off a little. Then we do something reactively, then we do something proactively. I'm almost positive this one will follow that same tried and true mechanism of decision-making. So, in the reactive category, our friends at ISO New England, we hear are working on potential -- looking at cordon changes to the electric day.

Just backing up, there's two big macro categories of issues. One is operating issues, communications, the gas and electric day, how they align, how people communicate in emergencies and so forth. And the second are more fundamental pricing and market issues. The fact that the way we decide to build gas pipelines in this country, and how the financing lines up and how the commitments line up with fully subscribed long-term plans being aligned through an open season is fundamentally different than the way generation capacity is awarded in an organized market, which is not 15 or 20 years ahead. It is in real time and, at most, three years forward in reliability payments, and those do not neatly dovetail. And that was where a lot of the action was at the technical conferences with the gas people saying, no problem just make a firm commitment, and you'll be fine. And the electric people saying, no problem, just let us decide the day before, and we'll be fine. And there's got to be something between day before and 15 years here.

And definitely regional differences and I got on this by saying New England, we hear, is working on a potential supplemental procurement to price fuel security into some of the capacity through, in the first instance, a procurement of fuel security that might pay more for -- what do you call it? -- dual fuel capacity or having secure fuel supply, but we'll wait and see what comes in. We're looking forward to that as a test of a way to look at the issue. We also continue to get filings from gas pipelines of new flexible nomination cycles and so forth. Those are coming in quite frequently.

In terms of what we do ourselves proactively, one issue we heard about at just about every single -- I think every conference was something, some concern about the standards of conduct and enforcement and how it works on this. It did not fall into the category of saying is this paragraph 31-B? Fix that. It was just more like can't you give us some clarity here? We're worried about this. It's impacting

communications. So, we're figuring out whether to do some kind of focused docket or focused effort where we see if there's something we need to do, let's figure out what it is so we can do it.

But if folks have more focus comments for what they think they we need to do on the standards of conduct, I would really welcome those because we're working on trying to do, like, a what's next after the tech conference because we certainly don't want our -- even if we can't solve all the problems in one fell swoop, we don't want our regulations to make the problems worse. And the standards of conduct was a potential place where people thought the FERC regulations, which of course are intended to make sure people can't cheat in the markets if they have a market and a non-market part of their operations, whether those were carrying over to gas and electric operations which is not what they're specifically intended to be about. So, that's something we're working on.

I'm sure there's more I missed, but that's what I was going to try to cover to sort of

tee up, and with that I will take questions or listen to conversation. Thank you.

MR. COWART: Thank you very much. I guess I should just ask comments, questions, and we'll sort of start on this side and just work down. Lauren? Phyllis, sorry.

MS. REHA: Yes, I just wanted to add that at the NARUC, and Baltimore coming up in November at the Collaborative, the Smart Response Collaborative, the emerging issues part that I co-chair with John Norris, we're going to be doing a program on non- transmission alternatives, non-wire solutions, whatever you want to call it. And it should be a really good discussion.

MS. LAFLEUR: I think that's a great topic. I will not be there because I finally scored a Patriots ticket from my husband. My son has to go see his girlfriend, so I'm third on the list, so I finally scored a ticket, so I'll get there Monday morning, but it sounds great.

MS. AZAR: With regards to the gas/electric planning, was cyber security rolled

into the technical conference at all?

MS. LAFLEUR: Not in any significant way. I think it was mentioned as an emerging issue, but not -- it was more focused on are we going to have enough gas. I mean, are we going to have enough gas infrastructure. Obviously, cyber security could affect are we going to have enough gas, but not that I remember in those conferences. But I'd welcome comments about how we should tackle it and where. Just as a kind of editorial comment, I mean, we tend to think of cyber security very electric because that's where we have the reliability jurisdiction over the Critical Infrastructure Standards, but obviously cyber security has nothing to do with the electricity. It's something in the computer, and it can affect other parts of the infrastructure just as much.

MR. COWART: Chris?

MR. PETERS: Chris Peters, Entergy. Thank you, Commissioner, for spending time with us this morning. A question, and maybe you touched

on this earlier. The new office for cyber -- I think it's under Joe -- is how do you foresee that interacting with the industry and with the other agencies in the Beltway?

MS. LAFLEUR: I think it was a part of the specific remit -- oh, God, that's such an English word. It, like, came out of my past. A part of the specific charge of the group to work with other agencies because we do get -- I mean, not me, personally, but my understanding is the folks that work on this in Reliability get, not just a close working relationship with the Department of Energy, but we get calls from Homeland Security and the Department of Defense and so forth, and that would be the place that that coordination would happen. So, that was, I think, specifically mentioned in the press release that it would be a focus for coordination. We don't know what the White House is going to do, what Congress is going to do, but it seems inevitable that if anyone does anything, it won't give us unique authority that's unique to

ourselves and doesn't involve working with anyone else.

I think it's quite apparent this is a -- cyber security, in particular, is a larger problem than energy, and so there will be coordination involved. In terms of coordination with the industry, obviously, that's necessary. The question is how will that happen? There is a set up through NERC, obviously, with the industry, and we don't want to reinvent the wheel, but that doesn't relate to other parts of the infrastructure. Recently folks from the old OER -- I think it was before we set up OISE -- went out to EEI. I wasn't there but they went to EEI and gave a talk with some of the CEOs in the Colorado meeting. So, I mean, there are other ad hoc industry contacts, but whether we need some kind of more structured thing, I don't know if it's been thought about yet.

MR. PETERS: Let me ask one more follow-along question, and it's more of a compliance related. When I look at -- and I'm in

charge of CIP in my company, and I look at the top ten most violated standards. Eight out of those 10 are NERC CIP. From your perspective and what you've seen as FERC has looked at this, in your opinion, where do you think the industry is falling short? And why do you think you see there's these challenges that are systemic across the board from the CIP perspective?

MS. LAFLEUR: Well, I think the reason, my own personal opinion, the CIP standards are so frequently violated is because of the nature of the standards are so paper-workey, and that's because we can't make a standard to tell the software what to do. We have actual standards, like here's how you set a relay. Here's how you trim a tree. That's very concrete. It's something we've worked on as an industry, as a group, for decades. But how you do a standard for how you keep a technology network safe is a different thing, and so the CIP standards have had to go in a different direction. And I think that's related to why there have been a lot of

compliance issues.

But where I think we've fallen short, and I wouldn't hold up just industry by any means, but falling short is a strong word, where I think we have a challenge to do better is, in my mind, this is like a fundamentally different type of problem, cyber security, than the electrical security where it's more of an electrical engineering operating issue. As I said, maybe it took four years to debate what a minimum vegetation clearing district distance is, but we still know the concept of you keep the trees away from the wires. This is much more not as well understood, at least by the same people. It's a whole different skill set. I mean, I wouldn't know what's inside a computer, and when I get the things the home saying do you want to update your virus software, half the time I say, no, I'm too busy today. I mean, that's not a choice. It's just like later or whatever it says, not now. (Laughter) And I'm setting standards for it. (Laughter) And when I look at the people when I

go to the NERC meetings, for the most part, they're the ones who know about relays and transformers and trees.

So, I think this is just -- this technology has come up so fast that, as a society, we need to develop the expertise to deal with it. So, I wouldn't demonize the industry or whatever. I just think we all have an opportunity to step up because it's a different thing than keeping the lights on in the old fashioned way.

MR. COWART: I love your phraseology on things like we all have an opportunity to step up. It's such a positive way of saying it. Gordon?

MR. VAN WELIE: I guess Cheryl and to Pat, I mean, for the Committee, I had raised the gas/electric issue more than a year ago in this forum. And so, if you're ever interested in me giving an update on our current thinking, I'd be happy to do that. We don't have to take the time now, and if you've got nothing else to talk about, we can talk about this. But I do have one specific thing that I wanted to raise, which is of

all the issues that we've been looking at, and there's sort of half a dozen different things that we've got to go and do, there's one issue that it's still not clear to me how we address it. And I'm not sure we can get at it through our market design. And I wonder about whether this is not just one of those policy things that have to be dealt with because these are low probability but high-impact event like the magnetic disturbance issue that you were talking about earlier on.

And the issue really is -- and this is once again regional because I think it depends on where you are in the system. So, what we have is situation today where the electric system engineers spend their life sort of worrying about how do you cover the first contingency and the second contingency and so forth, and we plan the system out. We operate the system to respect all of that, but the underlying assumption is that every generator's got fuel on the system. And in a world where we have essentially reduced the fuel diversity on the system, which is where we're

rapidly heading in New England, where we will basically just be nuclear and gas plus a little bit of renewal NDR on the fringes, we become very reliant on a just-in-time fuel system. And in particular in New England, we are radial, so it's not like we're sitting at the most interconnected spot on the gas pipeline system. So, if you're sitting in Texas, and you're right on top of the Gulf, and you sort of look at a map -- I saw Barry Smitherman at a conference last week sort of threw up a slide and if you see how much pipeline is in Texas, I'm convinced they have high reliability because they've lost diversity there. When I look at the map of New England, I see four pipes coming into New England, and we're heading towards everything being dependent on the gas system.

And so yet, to me, is the policy question which is how do we deal with this issue of a very infrequent occurrence, but never the less possible, where a very large pipe goes up for whatever reason, and we suddenly lose 5 in New England, 6,000 megawatts of generation on the one

pipe? There's no way we can survive that, and I'm pretty sure if we go down we're pulling the rest of the Eastern interconnection down with us. So, how do you -- sort of in the world we've come from, we're able to survive that because we had diversity, and not only diversity but local fuel storage, so you had different technologies burning different fuels and each generator had some local fuel storage that they could live through that situation. Now we're putting all our eggs in one basket. At least I feel like we're doing that in New England because that's the way we're heading, and I don't know how to solve that problem yet.

So, I think I can deal with most everything, and we can talk about some of the ideas that we have, but that's an issue that is an open question in my mind. And I don't know how you get at that through anything other than some kind of regulatory fiat that says you have to go and do the following.

MS. LAFLEUR: Well, I think you're very right to raise it because I think at the tech

conferences and in the discussion, different issues are getting conflated, and so when people talk about the reliability of the pipeline network, a lot of times what they were really talking about was will there be enough pipelines because do they have the signals to build them and all and so forth, which is one -- that's more the market pricing issue that I raised. You're now raising almost more like a reliability issue. What if there are pipelines and a pipeline is lost, like, God forbid, an explosion or something? And then what's the -- and that almost is more like an emergency planning which is a different thing than the -- and I think we have to make sure we are looking at different dimensions of the issue. Most of the high-impact, low-frequency issues are dealt with through building in mitigation in the system ahead of the time to the extent you can, and then having emergency plans for what you would do.

And, I mean, someone was telling me that way back when something happened in New England,

they got, like, a Jones Act exemption to have LNG delivered on a U.S. ship. It was something in the '70s or something, and I'm thinking back to the Arab oil embargo, which I'm happy to say I wasn't a utility executive yet in 1972. Not that old, but it was in the relatively recent rearview mirror when I got into the industry, and all kinds of things were done in an emergency way when something happened. That hasn't been in our planning toolkit, but you're right to raise it to think it's a planning -- in my mind, it's partly a planning thing of what you do if you lost a pipeline. And I don't think we've answered it, but you're right to raise it. It's different than the other issue. They have different solutions.

MR. VAN WELIE: One of these sort of broader security issues, I mean, it strikes me -- I drive by some of the pipelines and the pumping stations and so forth. They don't seem to me to be the most highly protected installations in the world. And so, you just think about the vulnerability we're creating here where a single

pipe can take on that amount of generation, and that does worry me.

MS. HOFFMAN: So, my thoughts on this. I mean, we're going to have to do several things, and one starts out with evaluating the flexibility within the pipes themselves. Granted, not all of them are in the right locations with the lime packing or, basically, the extra capacity that are in the pipe is one thing to look at in relationship to the electric system. Then, from a resiliency point of view, what does happen if you lose part of a pipeline? There's segments and closures on pipelines, but you still lose the availability to the fuel, and so, what is the impact to your system? But from a diversity point of view, we have to recognize, first, the value of diversity of assets, and that is something that the regions really have to consider from a generation point of view.

MR. HEYECK: Commissioner, I've seen you in several venues and thank you for attending to give us updates on what's going on at the FERC,

and I appreciate your service to FERC. On the Transmission Subcommittee there are -- when Joe McClelland got his appointment, I sent him a note suggesting that he come to this Committee because I do believe we're going to trend into resiliency next year as a Transmission Subcommittee. So, he's certainly welcome to follow that activity.

The second is on our subcommittee, I didn't mention in our report that we're going to try to get on the agenda to do a follow-up as to how the grid operators are doing with respect to retirements, and then the outages for retrofits. Are there any issues? Is transmission going to be delayed and things like that? And certainly your attendance is appreciated, but I thought Joe McClelland would be a good addition.

MS. LAFLEUR: I agree that he'd be a very good addition, and I didn't mention when I did my little hot topics, we do have in prospect, still, the potential reliability issues coming on from the new environmental regulations. We have not, to my knowledge, gotten applications to look

at any fifth years yet, but if I remember correctly, the way the timing works there'll be like none and then they'll all come in.

And we do have at NARUC on, I think it's Tuesday morning, we have our forum on this, and we're going to look at -- the first part is going to be looking at mapped implementation. Some people who are actually doing it -- someone is coming up from Southern, and some other folks, and looking at kind of -- and Gina was kind enough to say she would come from the EPA, kind of how -- because the whole retrofit planning and how long it takes and so forth is now better understood than when we started at this a year ago. And so, we're going to be looking at that, and then have an update for state regulators and other NARUC attendees on other environmental issues that might have reliability implications, what should be on their radar screen. I mean, it's a week after the election, and that's what it is. I don't schedule the NARUC meetings or the elections -- (Laughter) -- but that's what we're planning to do.

MS. KELLY: Way back in a prior life, I spent 15 years doing natural gas regulatory work before the FERC representing local distribution companies, and they care truly, madly, and deeply that they don't lose natural gas service during peak periods. If that goes out, it's not just a matter of turning the system back on or back start, it's relighting every pilot. So, I think one of the issues, and there's a number of state regulators and recovering state regulators in this group who deal with that issue at the city gate on the gas side. Who gets the gas when push comes to shove? And then, there's the federal aspect to that in terms of interstate pipeline curtailments when you lose 60 percent of the capacity of the pipeline. Who gets it and who doesn't?

But that's a really hairy issue because if we're saying, well, we must have the gas because we're burning electric generation, and we are vital to our nation's economy and the lights must stay on, and our gas brothers are going to say, yeah, people freeze. So, that is, I think,

something we haven't fully come to grips with. I've actually suggested that we at APPA might be having a dialogue with our friends at APGA to talk about that because some of our members are actually common members, being gas/electric systems. But we have to come to grips with this and figure out if there's not enough to go around, what are the protocols on how we deal with it, and I just point out that this group may be able to contribute to that in some ways just because of who we have.

MS. LAFLEUR: Thank you. And the AGA, which I know is more than just the local distribution companies, but has a lot of local distribution companies has also been a very active commenter and speaker on this issue. And making sure that when we say "reliability" -- I mean, the problem is when people say "gas/electric interdependency," sometimes once they start talking what they're really saying is electric dependency on gas, and they're not really thinking about the "inter" part. But the AGA has been very

forthright in saying reliability is a two-way street, and we have reliability needs also, and make sure we're at the table. So, it's not just a conversation between the pipelines and the generators, and that's an important voice. I also, I don't remember, it was in some kind of storm, lost a gas network, and it is a beast to get them back. Yes.

MR. CURRY: A quick footnote. Someone told me in the last day or so that 80 percent of the members of the Gas and Electric Institute are also members of the AGA. So, it's possible to reach out still further through that link if that's appropriate.

Gordon, I hope you're satisfied. Everything's been taken care of.

MR. BROWN: Merwin Brown. There's another item relating to the interaction of natural gas and electricity that, at the moment, as far as I know, is just a concern and it may even be the urban myth equivalent for this industry, but that is as these new, faster gas

turbines are coming onto the marketplace to follow variable generation, the renewables, that that may pass on now through to be a problem with pressure maintenance on the natural gas system, and, therefore, lead to flameouts of combustion turbines, et cetera. And it may have other downstream impacts with it, I suppose, such as pilot light flameouts. I don't know, but I thought I'd get that on the record, anyway.

MR. COWART: Any other comments or discussion? Is that you, Barry? I'm in the office (inaudible) earlier.

All right. Thank you very much. And we're ahead of schedule, delightfully. And I've asked Wanda if she would be prepared to take an item from this afternoon's agenda and move it forward so that it'll make things easier this afternoon. And it turns out that the workforce discussion can be moved forward, so we'll just go ahead with that.

Meanwhile, Paul, are you crafting language?

MR. CENTOLELLA: Not yet.

MR. COWART: Okay.

(Discussion off the record.)

MS. REDER: Okay, I'm going to address the Workforce whitepaper, and just to give you some background since some of you are new, the first meeting this year we actually chose, as the EAC, to create an ad hoc working group for Workforce. The nature of this was really just to get a white paper that documented the issues and pull in experts, both from the EAC and outside of the EAC. There was quite a bit of debate on should DOE OEB, interested in this and, if so, why? And we really boiled it down to to the extent that the workforce is critical to providing reliable energy critical to innovation, critical to achieving the vision of the national future

grid, absolutely, there's an interest in. So, that was really the premise of why we took this on. I do want to acknowledge and thank all of those that pitched in here. There were a few from the EAC, but there many, as you can see, who

participated outside of this group in order to bring this paper to fruition. So, thank you. Some of you are in the room, and I appreciate your contributions.

The paper actually creates a pretty good background in terms of the situation that we have at hand. I think we're pretty familiar that the workforce requirements are changing. In fact, Cheryl actually suggested, in the last discussion, the competencies are evolving, so this theme continues to perpetuate and, of course, also there is a pretty good recognition that the attrition rate is significant in the forefront. In the last few Center for Energy Workforce Development surveys, up until 2010, the survey's done on an annual basis, it was approximately 50 percent attriting in the next 5 years. The 2011 survey adjusted that some, based on the economic challenges, suggesting that there are roughly 10 percent that are currently in position that aren't retiring because of depressed 401(k)s and such. So, actually, the ones we thought would be

retiring aren't right now, but in some ways that can compound a complex problem where more can leave at the same time if conditions exist and incent that behavior. So, really, this is a complex and kind of a combination of a lot of factors coming to fruition. Many people with a lot of expertise potentially leaving and, of course, the competencies changing at the same time. Behind that, educational infrastructure isn't necessarily there to the extent that we need it to be.

So, all of these factors kind of boiled into two sets of recommendations. We ended up having a lot of discussion and a whole heap of recommendations on the table, and finally stepped back and said, you know, there's probably only so much that DOE has the appetite or the capability to do. So, we divided it into an easier set that was completely within OE and DOE's purview, and then the second set is more challenging, either in terms of time or reaching across various organizations.

So, on this easier set, there was $100 million for Smart Grid education funding that was steered towards 54 different projects. That was released at the end of 2010. Those were three-year projects rather than five, so those are all concluding, more or less now. And so, the first piece, the first recommendation at the top of the heap -- and by the way, these are listed in what we think's priority order -- is to identify and figure out what can be scaled out of that effort, and try and collect that and disseminate it so we can scale it as much as possible and leverage that investment. And since those projects are coming to conclusion soon, time is of the essence.

The next piece is to look at the rest of the ARRA funded Smart Grid investment projects and ask the question, what kind of competency challenges, what kind of workforce implications are we running into here? Oftentimes with new technology, there's implication on process improvements, skill set changes, and to the extent that we can be capturing that along the way,

that's really good fodder to build into incremental education and competency planning going forward. So, it's kind of a situation where we have an opportunity to ask the question and simply collect the information and use it going forward.

The next piece suggests that as we look at the technology portfolio going forward, we ask a couple questions. One is as new technology is coming out, what are the skill set implications? Chances are there's new kind of background and skills and education that that requires. And the other piece is perhaps there's a situation where we want to take on technology investment to actually improve the situation for the workforce, whether it's safety or productivity. We used to kind of bring knowledge into the day-to- day work environment so you don't have to be training A-to-Z, so there's kind of a combination in that recommendation for both directions.

The fourth recommendation here is one where we recognize there's a lot of good bits and

pieces, a lot of best practices out there, and it's really been tricky to try and figure out who is doing what and disseminate that and scale it. And recognizing that it takes a lot of resource in order to get that done, an idea bubbled up to actually have a prize and acknowledge best-worker training and education programs at state and city levels. That's a way to collect the information relatively easily and then use that to disseminate and scale good ideas.

And this last one on the easier list, there was a lot of discussion on how do we communicate between industry and at the state level what the situation is. We really don't have good metrics or ways to have the discussion, and this, ultimately, morphed into account kind of a conclusion here on the easier side that we need to review the current state of benchmarking and metrics on Workforce needs. That's a beginning point. It's just to assess where we are as an industry and try and find out if there's best practices or ways that folks are having this

communication in a productive fashion. And that actually ends up feeding the more challenging conversation here on facilitating regulator and industry dialogue along these metrics front in order to advance that into something that's more tangible. The others are largely spanning across different organizations, increasing the National Science Foundation and the OE coordination, if you will. And not only those two, but then there's a lot of other multi-agency coordination that can and should be done: Department of Labor, Department of Education, and others. And in the paper, a host of specific suggestions.

The next one, we went back and forth in putting this in, but recognize that it was important though it takes quite a bit of work, and that is to look at scenario planning on what-if analysis. So, what's the difference on workforce needs if we're a highly centralized generation in a kind of a traditional approach going forward versus let's go completely the other direction where it's highly distributed, highly green, and

just the ramifications on what types of skills, how many people, where, the education ramifications? Certainly, there's a big difference in workforce outcome as you think about possible scenarios. We also recognize that it would take quite a bit of time and roll up your sleeves to get to this, but we think from an industry perspective it's important. So, the challenge is getting this thing done in a timed window that is meaningful because a lot of times you can drag these studies out and by the time they conclude, it's no longer relevant. So, that was some of the discussion there.

This next piece is identifying best practices to accelerate, transition into the workforce, recognizing there's veterans and engineers from other disciplines that if they had some education and where with all to get acclimated in the industry, it could really give us a jump start. Next one is buying some time retaining experienced workers. There's a host of ideas in there on how to do that, as well. And

the last couple: Making sure that career opportunities are very visible so we can attract the best and brightest, recognizing this is a critical component, especially in recognition of the attrition challenges. And the last one is an educational roadmap that aligns with industry needs. Oftentimes we get kind of mapped toward the R&D and it may not exactly align with the hiring requirements going forward. So, those were the comments.

I have received a couple things. One is cyber security comments from Chris, and I appreciate that. Great comment, so that was a paragraph that can be added into the overview, and I thought it really added a lot. Dave Nevius also suggested that we could look at the current programs in the United States and perhaps assess where those are, and I have drafted a bullet that would go into that section, too, suggesting that DOE works with the IEEE Power and Energy Society and goes through our annual survey data to understand the trends, the curriculum, faculty

demographics, and just the number of students that are going through to monitor trends and where we are.

With that, I'd be glad to -- I'm looking forward to your comments. Obviously, the Ad Hoc Committee is wanting to know if there's anything else that they should be doing or if this paper wraps it up, too, so at some point feedback along those lines would be useful.

MR. COWART: Okay, any comments, questions? Tom?

MR. SLOAN: Tom Sloan. And I had recommended the first item on tier 2 be a higher priority, and I'm not really trying to re-raise that issue, but from a policy perspective, I hear a lot of the sky is falling arguments. We're going to run out of teachers. We're going to run out of physicians, nurses, veterinarians, electrical employees. Not bartenders. (Laughter) As long as we have college students, at least. And simply having the educators come in and saying we've got to get more investment in getting

teachers trained and retraining teachers. Or the electric industry, we got to get more line people trained or operators trained and such doesn't prove to be very persuasive. And so, I advocated fairly strongly that department work with the Department of Labor and other organizations, I mean, including the industry, to develop a metrics that sort of predicts when folks will go out. Not individuals but broad ranges, and that kind of a metric, if brought to me and I'm thinking a majority of my colleagues, can't help in guide us in terms of emphasizing where vocational technical training should be, or what we can do with the Department of Labor in terms of advertising opportunities or any number of other gambits available to help the industry. So, I basically am raising the issue about we need to be more persuasive about saying what the problem is if you want focus of government to help solve it.

MR. COWART: Wanda, I guess one question is, the Committee's fine with the placement of this recommendation Tom was just talking about?

MS. REDER: Yeah, the recommendation to actually do some benchmarking in that near term that would ultimately lead to more concrete next step is where we ultimately landed as an ad hoc committee.

MR. COWART: And I'll ask a really basic question about the structure. The recommendations starting with 2.1 are included underneath the heading that says Appendix. Right? And I guess I'm curious as to why, if they're recommendations, why they would be in an appendix? Or are you suggesting that we not adopt them? They're only things to think about in the future? So, what's the message here?

MS. REDER: Well, yeah, that's a fair question. We had an assumption that there's only so much capability and this is a topic that is kind of on the peripheral of some of the other activities, also recognizing that there was just a load of recommendations coming in from very core areas. What we wanted to do is focus on the things that we thought would really make a

difference with as little amount of incremental effort or money as possible. And we didn't want to get that message diluted in a whole host of things, so it's not to say that the recommendation 2 items are not important. That's not at all. It's just to say that as you get into that second tier, it's going to take a lot more effort and a lot more coordination across other entities in order to have the impact.

MR. COWART: I guess I get that point, but to the reader, I can just report that it's not entirely clear. So, maybe, just where the phrase -- where the words "appendix" are stated, that a phrase that says these are things that we think are important, but we recognize DOE has limited capability. I realize the text does say that elsewhere, but.

MS. REDER: We can change that. Sure.

MR. COWART: Mike?

MR. HEYECK: First, I wanted to acknowledge Wanda Reder's industry-wide effort with IEEE and setting up the foundation and

actually just doing more than putting something on a piece of paper, actually walking the talk, so I appreciate that. I actually appreciate the report. I just want to give you an anecdotal situation that, perhaps, the government can help. I was given a tour of the high-voltage labs at the Ohio State University -- (Laughter) -- and asked to support a professorship along with, I think, Duke Energy, and we did. We got the professor established so we have, actually, a high-voltage. The lady that gave me the tour was a Ph.D. student in high-voltage technology. I gave her my card.

I said, if you ever need a job, just call me. She's now working for AEP; however, there was a big hurdle to go through. She was not a citizen; she had a visa. And we have to make that process just a little better in order to keep the people that want to stay here that are attending our universities. What's underlying this, and I'm on the Industry Advisory Board of the Ohio State University, what's underlying this is that as budgets are cut, the international students are

more welcome because they pay full freight, and if they're being trained here, we need to try to keep them here. And that is hard for a utility to do. We did it. We have this lady working for us, but I just tell you that that's an institutional impediment.

MR. CENTOLELLA: I just want to supplement that with an anecdote. I had a conversation with Dr. Lee, who's the chairman of the Power and Electrical Engineering Department at the Ohio State University. He was very proud of the fact that they were among the leaders in having a high percentage of domestic students in his program. That high percentage was about 35 percent, so it gives you an idea of what the challenge is in terms of being able to retain international students in this field.

MR. COWART: Is there enough here, Wanda, to suggest that a statement or a paragraph to that affect in this document?

MS. REDER: Yeah, I think, at a minimum in the section 2 where it's coordinating with

other organizations, we should add a bullet on visa and kind of this international alignment. So yeah, that can be done. And my thought is do it today, and get it approved today. (Laughter)

MR. COWART: You got my next question.

MS. REDER: I get it.

MR. COWART: To Ralph, and then Dennis.

MR. MASIELLO: My comments were in the same vein, so I won't elaborate but two other dimensions to that. One is to get Immigration to recognize electric power -- call it engineering -- but the disciplines we're looking for, as critical a skill on the list.

And second, I really hesitate to bring this one up because it's a can of worms, but because of the cyber security issues and the DoD thrust into the same stuff we're talking about -- micro-grids, et cetera, there's real concern now that some of those technologies land on export control lists. And that means it will be almost impossible for normal energy sector people to work on this stuff because you've got to go get an

export license for the controlled technology. And so, there needs to be -- I don't know what the answer is, but a micro-grid ought not to be on the export control list. And cyber security's probably dicier, but those are similar issues that crop up. And of course, if you have a foreign student from a country on that list, then the challenge is almost insurmountable, but that's a different problem.

MR. McGINN: Two things. Just an observation on the subject of foreign students and foreign workers. This is a problem that applies in just about every technical aspect of life in the United States, whether it's IT or biotechnology, certainly electricity. And it's a problem that needs to be addressed more broadly. I'd like to pick up on and expand on the point that Robin Podmore made yesterday about veterans. Culturally and technically, there's such a huge match between our industry and a lot of the things the Armed Services do. And while there have been efforts to make better matches, I think we can

probably do a better job. And ideas that I would like to have considered would be -- you may have heard of things like eHarmony. Well, that "e" could be electricity where we put forward a model of a dating service, effectively. Monster does it broadly across the job-search area, but you'd want to have participants from, obviously, the industry, every aspect of the industry that produces electricity and delivers it and uses it. You'd want to have the Department of Energy, obviously, the Department of Veterans Affairs, DoD, and Labor, to an extent, populating databases that make these, and then having a good matching algorithm where you could categorize types of skill sets and skill demands into various jobs. And I think it would really accelerate and make these better matches.

The other sector, if you will, that should be considered is there -- and VA would have a pretty good handle on this. There are many nongovernment organizations, like Veterans for Green Jobs out of Denver, Colorado, or The Mission

Continues out of St. Louis, that are in the business of trying to place veterans in energy. And I think that this could be another input into eHarmony.

MR. HUDSON: Wanda, as a newbie I lack context around this, but what struck me about the paper, and perhaps it's implied in this identified best practices, there's a tremendous number of specific efforts ongoing by individual utilities to work with local community colleges and stuff like that. And I found that there was sort of a general lack of acknowledgment in this white paper around those efforts, and I wonder if you could speak to that.

MS. LAFLEUR: Yeah, that's a good point. There is a lot of good effort that is underway, and I think in many cases we just don't have the visibility, and because of that lack of visibility we haven't been able to scale or leverage or kind of learn from another. So, that was one of the things that got us to the point of that prize or award is that we would have a mechanism where

people could actually, oh, I got a really good thing going on here, and submit it, because the challenge has been figuring out how to get visibility and get that collection done. And we thought once we had that in a database, we could turn around and not only give visibility to good things that are going on, but that information could be helpful to disseminate the best practices. To your point, we could escalate and make it a little bit more visible that there are some good things happening, and that's what causes the recommendation, if you like.

MR. SLOAN: Tom Sloan. To pick up on Denny's comment, unlike you, I'm involved in a lot of other endeavors and one of which is with the Department of Defense. They have increasingly become aware that as the military forces are going to downsize starting next year, they need to be a lot more engaged, too, in getting veterans jobs. So, what they did is they have approached legislators through NCSL, and we're developing model legislation that will allow our higher

education institutions to accept the training certificates that the DoD employees earned.

Basically, what we're doing is, just as we have universities review the community college criteria for transferring course work, we're now, with the DoD cooperation, figuring out what a certificate in power plant management means education-wise, so we can get them the recognition for the additional courses they need to fill the jobs that are out there. So, that's a major effort, but something that sometimes you might want to have DoD come in and talk to us or to CEWD or something like that. But again, that's an example of where the State can help in terms of addressing this.

MR. COWART: Thank you. Anything else you need, Wanda? It seemed to me you were making a list of relatively minor adjustments to the paper that we could put in front of the Committee in recommending adoption.

MS. LAFLEUR: Correct. And I'll work on that over lunch and be glad to take some comments

to accept that people want to get a pen out. I got the Recommendation 2 piece. Certainly visa immigration and that whole theme along with, maybe, some little added commentary around veterans and that there is a culture and technology fit, the whole dating service piece of it, if you will. A bit more context on the award, and then picking up, maybe, on a future panel as Tom suggested.

MR. COWART: Okay. And our goal would be to have a very concrete statement of editorial amendments that could be made to the paper that we can vote on.

MS. LAFLEUR: Exactly. All right.

MR. COWART: Thank you very much.

MS. LAFLEUR: Thank you.

MR. COWART: All right. Well, we're a little bit ahead of schedule which is terrific, and I'm going to recommend that we adjourn for lunch. We're going to -- is there a preference? I guess we're scheduled to resume at 1:15. I think we should stick with that. Gives everybody

time to take care of these editorial issues over the noon period, and look forward to resuming at 1:15.

(Whereupon, at 11:49 a.m., a luncheon recess was taken.)

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

(1:14 p.m.)

MR. COWART: Good afternoon. I think we're ready to resume. So how I'd like to proceed this afternoon is to first take up the three reports that we had relatively minor editing challenges with. And I understand that we have actually resolved the issues in all three pieces. And so I think we can take them up relatively in a straightforward fashion.

I'm wondering where Paul is, that's all.

MR. MASIELLO: Paul in particular has seen every change.

MR. COWART: He's seen everything and he's ready, okay.

MR. MASIELLO: He can attest to that when he reappears.

MR. COWART: When he comes in we'll do it, all right.

So first let's hear from Mike Heyeck on the next generation EMS.

SPEAKER: No.

MR. COWART: Oh, I'm sorry, it's not that.

SPEAKER: The non-wires.

MR. COWART: It's the non-wires. We have a mike at the podium, so I'm not going to take it in order.

Please go ahead, Ralph.

MR. MASIELLO: I thought you were saying (inaudible).

MR. COWART: No. Because of the order you did them this morning is different than where you're standing.

MR. MASIELLO: (inaudible) that monitor and the projector has presence.

MR. COWART: There you go.

MR. MASIELLO: Good. So what I propose to do is go through the edits. And if need be we can zoom, et cetera. But we inserted paragraphs. Paul largely drafted them. People read them from a distance, or should I zoom this thing.

MR. COWART: You're going to have to zoom it for me, anyway.

MS. HOFFMAN: Just read it.

MR. MASIELLO: We note that there are significant opportunities to take advantage of the fact that many end uses of electricity arc associated with thermal inertia, including heating, cooling, water heating, and refrigeration and/or have flexibility in the timing of when they draw power from the grid; also including pumping loads, industrial batch process pool pumps, dishwashers, clothes dryers, and the charging of vehicles and other battery-powered devices.

There are numerous technologies for optimizing demand that have implicit or explicit abilities to not only reduce demand but to shift the energy usage and time in a controlled fashion. Many are controllable delays or deferrals of energy usage. Some are more flexible and the energy can be consumed in effect earlier than really needed and then effectively recaptured when the end use demand is real. Examples include the control of hot water heaters, which is a delay or deferral and the pre-cooling of buildings which is

early consumption and controlled recapture. And then it mentions EV smart charging.

Keywords. It says these technologies can provide many of the same benefits and applications as the grid to grid storage technologies discussed in the report. The focus of this report is on storage technologies which are electrically fungible in that the storage resource and storage energy can be redelivered to the grid as electric energy in some way.

Okay. That last sentence is key. Mike Johnson from Arpa-e came over to explain the need and decided that it's worth giving him a day to give us the paragraph and the links to the appropriate Arpa-e website reports for an overall summary of the Arpa-e storage program. So that will go in here in place of this table.

Then, however, this is a new recommendation that came up as we were drafting. This is a new, therefore, worth looking at, because somebody from DOE pointed out that the language that was written basically said don't

kill what's already committed, but no more than that. So this language says we encourage ongoing storage technologies, research and applications development. And then at the bottom insert, we also encourage that Arpa-e establish new programs in these fields on an ongoing basis. That's a significant change. The point of that clear?

This is just a correction that Paul had at Section 5, not 4.

MR. COWART: Going back to that last point. Couldn't that just say DOE established as opposed to Arpa-e?

MR. MASIELLO: The point was that the next Congress could not fund new Arpa-e projects.

MR. COWART: Right.

MR. MASIELLO: This recommendation is saying in effect, it should be, as opposed to DOE. This is Arpa-e as opposed to DOE.

SPEAKER: DOE established (inaudible).

MR. MASIELLO: In the interest of time I'll do that offline.

This is simply pointing out in the

discussion of RPS studies that need to include storage also include the demand optimization technologies. We agree that demand optimization is preferable to demand response.

At this point, Pat, we need DOE to validate has the storage technology roadmap been published or not. If it is published we shouldn't have a recommendation that it be published.

MS. HOFFMAN: Is it published?

MR. GYUK: Well, it's published in the sense that it's on the OE website.

MS. HOFFMAN: So the answer is yes?

MR. MASIELLO: That would be published.

MR. GYUK: Yeah, together with the backup documents from the workshops that led to the strategic map.

MR. MASIELLO: Okay.

MR. GYUK: And events really I'm sort of thinking of doing an update to that roadmap this year or a new one.

MR. MASIELLO: Okay. Similar comment about demand response not being in scope. Paul

inserted the language about ERCOT's developed revised protocols and we'll have to find the citation.

Okay. Here's a link to the non-wire solutions, actual hyperlink to be set up when there is one. Correction to the Presidia megawatt, MVA point.

And then refers again to the demand optimization of the use of thermal storage. It makes a new point not made up front that says these may be potentially available in large amounts and represent cost-effective alternatives to electric storage.

This clarifies the CPUC ruling on the Southern Cal Edison and (inaudible) right source. Very specific updates to the AES LIPA proposal.

This one's important. The 2008 report had a specific recommendation that said launch and accomplish the materials genome project for analysis of alternative materials. This isn't a part of this report which is simply saying look at the 2008 objectives, what's happened. And after

spending some time with Mark we generated this language that said Arpa-e is addressing this in a number of programs which are currently not being addressed by the DOE OE roadmap as intended. And then it has examples of the GRIDS program and the SBIR STTR program. So that's the correction to the discussion of the materials genome.

Everywhere that it occurs now there's common language that said that of the four energy storage research centers in the 2007 act the goal is still open. There is an open RFP process for a storage hub as of today unless someone corrects it. And there are more edits, bear with me.

Commissioner LaFleur kindly got somebody to give us the correct reference to the open NOPR so that citation is complete.

This was what I referred to this morning. The flow of these bullets needed to be corrected. And so now it --

MR. COWART: You just reordered them?

MR. MASIELLO: Pardon?

MR. COWART: This is just a reordering

of those bullets?

MR. MASIELLO: Yes, the recording of bullets. Alternatives could include, and then following four bullets. The ones in red are the paragraph that was in the wrong place.

MR. COWART: Right.

MR. MASIELLO: This is deleting the backhanded comment about decoupling. And again in the FERC NOPR was supposed Order 1000.

Here we already had the reference to the EMS whitepaper. We'll add a link when it's available.

This is also just reordering the discussion of capacity factor and deleting the paragraph that people didn't like, this one. There's some discussion about this graph going on. And people were trying to find a better graph from EIA. But at the moment this is what there is. The source of this graph was taking an EIA table of capacity factor by generation type nationally and summing it. And there's an ongoing discussion about why it's so saw toothed. So if something

prettier appears we'll plug it in.

And this is Sonny's comment on cost disallowance. Sonny typed this for us.

And here's the same language about Arpa-e. It will be corrected as we discussed earlier. And the same language about the (inaudible). And that's it.

MR. COWART: Okay. Are there any clarifying questions or comments on this?

MS. HOFFMAN: I guess I just have one question. Does this also include the Recovery Act projects and (inaudible) projects?

MR. MASIELLO: They're summarized in the very beginning.

MS. HOFFMAN: Okay. I missed it.

MR. MASIELLO: They're summarized in the very beginning, Pat, and they're discussed under ongoing R&D and the section on DOE R&D with highlights in some of them.

MR. GYUK: Because you're showing the loving AES project in West Virginia and apparently not equally lovely projects that we're doing.

MR. ROBERTS: With the best photos we had equal time.

MR. MASIELLO: Equal time. And we made the point that some storage applications are commercially viable as evidenced by private investment going ahead without DOE. The scope of this report is more than just what is DOE doing. It's what is the market doing? What is EPRI doing? What are the states doing? But I think, Imre, some of your projects are in there, pictures and all.

MS. HOFFMAN: Does it refer to (inaudible).

MR. GYUK: I even considered them commercially viable.

MR. MASIELLO: Pardon?

MR. GYUK: I even considered them --

MR. MASIELLO: I did not mean to imply otherwise. I simply said it was noted, sorry.

MR. GYUK: Oh, I see. I know you know.

MR. COWART: Okay. So I think we're ready to advance the report for approval. And

just to be clear, it would be good to start over again and take a motion and a second.

Tom?

MR. CURRY: I move we accept and advance it.

MR. COWART: Second? Wanda? Okay. We have a motion and a second to accept the report with the revisions we've just been shown.

MS. HOFFMAN: Can you just reference OE as part of the Recovery Act? Because you just say -- I mean you reference Arpa-e directly.

MR. MASIELLO: Yeah.

MS. HOFFMAN: But maybe I'm missing it. But I don't see the Office of Electricity referenced to the Recovery Act projects. I see DOE, ARA.

MR. MASIELLO: Sure.

MS. HOFFMAN: It's on page 73.

MR. MASIELLO: 73 or 70?

MS. HOFFMAN: Okay.

MR. MASIELLO: Pat, which page?

MS. HOFFMAN: I have page 73, but that

was before all your edits.

MR. MASIELLO: That's in the appendix.

MS. HOFFMAN: Okay. That's where I found them listed.

MR. MASIELLO: Pardon?

SPEAKER: Right up front.

MR. MASIELLO: Yeah, we ought to put it right up front. I mean this is right out of, by the way, the DOE database, these projects. But let's go up front and make sure. Rather than wordsmith in front of the group I'll just put a comment in here.

MR. COWART: I take it you're accepting that amendment?

MR. MASIELLO: Yeah.

MR. COWART: Okay. So we have a motion and a second to adopt the report as amended and as subsequently very slightly amended. Any further discussion? Clark?

MR. GELLINGS: So moved.

MR. COWART: Okay. So moved. We're ready for the vote. All in favor say aye.

GROUP: Aye.

MR. COWART: Any opposed? All right. It's unanimously approved as amended. Thanks very much, Ralph.

MR. MASIELLO: Thank you all.

MR. COWART: And thanks to all the folks who worked over the lunch hour and for Paul's contribution, Lauren's intervention. Looked like there were quite a few people working on the draft, and you all deserve some credit for coming to closure. Thank you very much.

MR. MASIELLO: Thanks again.

MR. COWART: Okay. Next is -- now we'll get to Mike.

MR. WEEDALL: Well, I apologize that I can't put it up on the screen. I did it the old fashioned way with the pen like while I was sitting on airplane. So I'll just run quickly through the comments that I received and how the changes are going to go in. Paul gave us a couple of comments, and I'm sorry I didn't get a chance to see you over the lunch hour, Paul, to go over

this. But you were talking about the fact that within utilities it's not unusual to have the stove pipes and the staff's never getting together. I mean out in the Northwest we actually had a river between us. Had to swim to get to the transmission people. But you also talked again about the fact that there's a need for an integrated planning process. So right up front in the paragraph, the third paragraph that talks about the challenges associated with non-wires crafted the word that says, another challenge is traditional. Utility structures where transmission staff and expertise for non-wires are typically not integrated. And this integrated planning process is one that needs to be fostered. So I think that captures the essence of what you were talking about.

MR. CENTOLELLA: That's fine.

MR. WEEDALL: Yeah. Good. Merwin had a comment about the fact that another advantage of non-wires is better information, etcetera. And you can find out that you actually have existing

capacity. I could go on for a long time about the experience at Bonneville and the benefits we got out of that. I would just add a bullet on the second page of the paper where we do summarize the benefits of non-wires as saying that it enhances the capacity of existing systems through the additional analysis and information. So I think we got that one.

That work for you, Merwin?

MR. BROWN: Oh, sorry. Is Billy here?

SPEAKER: Yeah.

MR. BROWN: Are you happy with that?

MR. WEEDALL: Okay, terrific. Let me see. Next we go back to the recommendations. And between Sonny and Tom and Barry I wanted some elaboration on groups that should be mentioned there as being part of the outreach. So we've added the National Conference of State Legislators, industry representatives, NASUCA, and the counsel of state governments to that list. So I think we're good there. Gordon chimed in talking about there should be reference to the

FERC because of their regulatory practice. So as part of that first recommendation I penned in the words, coordinate with the FERC to insure lessons learned and best practices can be considered in their regulatory role.

And that brings us back to the last comment. And I didn't write this down so I'm forgetting who gave it to us, but somebody wrote an additional recommendation here. I'll read to you and then whoever it is can admit that they did that and I apologize for not being on top of that detail. But suggestion is to add again one last recommendation that says, increase the research and development emphasis on non-wires. For example, use of SynchroPhasor measurement based tools and real-time thermal rating to optimize the carrying capacity of existing and new transmission assets by providing better knowledge of the situation of the grid.

Was that you, Billy? Was that Merlin?

SPEAKER: That was Merlin, yeah.

MR. WEEDALL: Okay, great. And that's

consistent with the comment that I put in up front. So I think that takes care -- and then Rich you had the comment about dropping the two appendixes, so they weren't really comprehensive in talking about that. So, yeah, go ahead and do that. So I think that takes care of housekeeping.

MR. COWART: Again, any clarifying questions at this point? Are we ready to roll? Do we have a motion?

MR. CURRY: Motion made.

MR. COWART: All right.

MR. CENTOLELLA: Second.

MR. COWART: Second by Paul. All in favor of adopting the report as amended say aye.

GROUP: Aye.

MR. COWART: Are there any opposed? All right. The report is adopted as amended. Thank you. All right. And since we're on such a roll Wanda is going to take us to the next one.

MS. REDER: Workforce, right?

MR. COWART: Yes.

MS. REDER: All right. So I got the

edits here. So essentially what we got here is a document that has edits. The following is high level we're incorporated. Chris Peters had language on cyber which was accepted in full. Based on Rich's comments on confusion of Section 2, Section 1 it now reads Section 1, Section 2 with a conclusion at the end. The word prize was changed to recognition program as a recommendation that came from Pat. There is language that says collaborate with IEEE Power and Energy Society for understanding curricula on and trends both from the education and also the enrollment and faculty piece. And then there was also language on engaging with DOD and bringing career visibility to veterans, mapping veterans back into prospective careers. And last but certainly not least is language on the for national peace. So with that I'll just show you the specifics.

The very beginning we have the cyber language that was incorporated. So it's just a little slow going on here. But there's a few cyber that was inserted in front of secure in the

overview. And there's a paragraph that was added.

Chris, do you want to talk to this paragraph at all? It's your language.

MR. PETERS: Sure. Chris Peters, Entergy. There's been a lot of discussion about the workforce, Asian workforce issues. You know from a cyber prospective there's just a dearth of expertise that can operate both in the cyber arena and in the control system arena. And this is something that was called out in the Center for Strategic International Studies. I think it was back in 2010 that the human capital crisis. So I add some of that language in there and it's just something that we can call out and work with the DOE on how we can offer some practical suggestions on helping aid and develop the workforce on a number of different levels and this language calls that out. So we do have a specific reference to cyber and the white paper now.

MS. REDER: All right. This next few minor edits is just simply a definition of Section 1, Section 2 and their proximity in the paper.

Changing prize to recognition program. That was a change throughout. And as we cruise on down here I think that summarizes everything in Section 1. The remainder fell in Section 2 which will take a while to get. Recognition program. Yeah, the summary went to the end of the paper rather than the middle. And now we are to the section that tees up the interaction with DOD and career visibility. Eventually we'll get there. Promise. Collaborate with IEEE PES to work with their survey data. Understand transfer demographics, curricula, et cetera. And the next one, DOE engage with Department of Defense and higher education to determine how military certificate training translates into additional traditional academic degree programs. And the last are more substantive comments that came out of discussion prior which is more around the career awareness and foreign nationals right at the bottom.

Build a map between energy, industry, jobs, knowledge, skills, and attributes and military occupation specialties so that veterans

can understand how they best fit within the energy industry, one, and coordinate with DOD and VA to educate veterans on industry career opportunities for example through the DOD transition assistance program.

And then the last one which you guys had a fair amount of discussion on was the For National Peace. There was just a little bit of background. There are many foreign nationals in school in the U.S. that receive degrees and advanced degrees in power systems. These professionals later may need VISA sponsorship to remain and work in the United States. And there was one bullet at the bottom. Study the issue of sponsoring foreign students by energy organizations to retain well educated foreign nationals to fit future industry needs.

So that's it. Comments? Yes.

MR. SHELTON: Chris Shelton, AES. I recall there was some discussion about recognizing what industry is already doing in this regard. And one example of that is the Troops to Energy

Initiative. Is that recognized anywhere?

MS. REDER: I forgot to put in Troops to Energy. We can find a place for that and it will be a friendly amendment. Actually I did pick up that there are some quite successful programs in here, and that teed up the recognition programs. That was added.

MR. COWART: Anything further?

MR. NEVIUS: Yeah. Wanda, with regard to university curricula, the comment I was making had to do with the Energy Systems Engineering Institute which was a concept developed by EPRI and deployed in a number of universities around the country, including Lehigh. And it was that specific interface I was talking about, not necessarily with IEEE PS.

MS. REDER: Okay. So we can specifically cite that.

MR. NEVIUS: You could say IEEE PS and --

MS. REDER: Right.

MR. NEVIUS: -- the universities that

are promoting more of these university programs to develop this energy systems engineering curriculum.

MS. REDER: Okay.

MR. GELLINGS: There are others. You might just put some words in there. I mean, the Office of Naval Research at the University of Minnesota is one.

MS. REDER: That's actually why I left it generic. Because from the PES survey we actually catch class by class. And some of these aren't formulated into exact programs, and it's really a moving target right now. So I can give some examples. It's easily done.

MR. COWART: Anything further? Do we have a motion?

MR. BOWEN: So moved, Rick Bowen.

MR. COWART: Thank you, and a second? Brad? All in favor of adopting this report as amended and as --

MS. REDER: Friendly amendments accepted.

MR. COWART: Including the friendly amendments, please say aye.

GROUP: Aye.

MR. COWART: Are there any opposed? Again, it's adopted as amended. Thank you very much, Wanda.

MS. REDER: Thank you.

MR. COWART: All right. I think I want to congratulate again all the people that worked since this morning to bring these documents to the finish line. And now --

MS. REDER: Are we ready for the next one?

MR. COWART: Yeah, we are.

MS. REDER: All right. Hold on because we have a crash course and all the activity going on in smart grid. We have three folks here from DOE: Eric Lightner, Joe Paladino, and Chris Irwin. So there's a lot of content here in a half hour, and I'll just them take over.

Go ahead.

MR. LIGHTNER: My name is Eric Lightner

and I'm going to roam around rather than stand behind the podium in your way. I won't be there for long, so I'll be moving.

But I wanted to update you all today on what we're doing through an (inaudible) agreement on smart grids through the IDA and all of you are familiar with the planning agreements and all that. But basically it's a mechanism that calls for international (inaudible) collaboration, plus a call for (inaudible). And one of the ones that DOE is leading is the smart grid (inaudible) agreement. One of those tasks or projects which they call annexes we are also the lead on, and that's what I'm going to tell you about.

So it's some work we've been doing on what we're calling the global smart grid inventory. And just a little background on that. We first said, okay. We want to collaborate on smart grid. We want to coordinate on smart grid things. What does that mean? What kind of projects are we talking about? What kind of work are we talking about? So we figure the first

thing you do is kind of get to know what's going on in each of the countries so we can then figure where your common priorities are, where are common goals are and how we can better best coordinate across those boundaries, if you will, those borders. So these are the countries involved and have officially signed up to participate in the implementing agreement on smart grid, also known as ISGAN.

So test one. Test one, this global inventory, it really has three tasks: It needs to look at the framework assessment on a national level, (inaudible), and technology priorities for smart grids. So what does that mean? We wanted to get a feel for what's the environment in all these countries? What is really driving countries to do smart grid deployments. So we wanted to get a handle on what those main drivers are and what technologies are you using in your country to try to accomplish, try to get to those goals that you've set up through those drivers. So what are those pairs? What are those driver technology

pairs because they can vary depending on developed economies and developing economies. So we wanted to get an idea of what's pushing the country to do investments in smart grid.

Test 2 is really to then look at, okay, we know the drivers, you know the technologies. Now, what projects do we have within those countries that are representative of those technology drivers pairs.

And then third, let's do some analysis on those projects to really look at the projects that we have in common that we really want, we want to monitor, we want to evaluate moving forward, so that's really how it set up.

This is way too busy to look at but basically what we did was we developed a drop down menu if you will of 24 drivers in seven categories along with 50 technologies. And then we developed a web-based survey tool around that so that countries could easily, remotely fill out what the top six motivate drivers were and what their top five priority technologies in each of those driver

categories. So it's just to give you some insight into what's really motivating our country. So at the end of September we completed 35 of these surveys from 21 of the 22 countries. We validated the majority of those which just means that the official executive committee member from that country has signed off on the completed survey. We are still waiting for some evaluations. And some have actually been thrown out. So what do we do with that?

So basically we collect the information then we sorted it and sliced and diced it in different ways and basically come out with these listings of basically all the drivers across all the countries, all the technologies across all the countries. And that we look at it by economies and by continent. So the Australia case is kind of a non-case but it's the same in those situations. I have a copy of what I'm going to present here today as far as the results. I have a report. I have 10 copies of that report. I'll pass around. And if I need more, if anybody wants

one that didn't get one let me know and I can get one for you.

So for the U.S., so this is the U.S. case. I thought I'd give you first. So for the US the top ranked drivers for the U.S. as far as smart grid goes is system efficiency improvements, be liability improvements compound or restoration, enabling, customer choice and participation, enhanced power system resiliency, and regulatory compliance. That's how it stacked up using this again a web-based tool for the U.S. And this is probably too busy but you're going to see this in the report. These are those top drivers and the associated technologies that are being utilized with those drivers. So system efficiency to enabling customer choice, like here you can see demand response, AMI is in here.

So this is the meat of the report. This is what we want to try to start to see. So these are the top 6 ranked drivers across all 19 countries that had validated results. And as you can see the top drivers it's kind of interesting,

right. Renewable energy standards or targets is the top driver across all those countries. And that's sort of tends to make sense because majority of these countries if you go back to the first and second slide that I had this a lot more developed countries that developing countries in this implementing agreement. So they tend to dominate when you look at all the countries.

Number two is system efficiency, reliability improvements, enabling customer choice, and the top ranked technologies across all countries. No surprise, right? AMI is the number one technology across all drivers across all countries, large-sized variable renewable energy sources, demand response, wind, and distributed energy resources.

So if you look at it more as from the developed economies versus the developing economies you start to see some differences. It starts to diverge as far as why they're doing this. What are their main drivers? You can see in the developing economies is reliability

improvements. That's their number one thing, right? Brazil, South Africa, countries like this, they're really after theft detection, right? They have theft up to like 30 percent on their system. So really just being aware of where their energy is going is a really important to them and improving the efficiency of the system overall, whereas you can see from the developing countries we're more focused on renewable integration and also enabling customer choice and participation. That doesn't even show up on their list over here.

And then the top ranked technologies across all drivers again for the developed economies and the developing economies. I won't go into too much detail since I think I'm running out of time here. So that was all the first task.

The second task was then, okay, let's start looking at projects now that are representative of each countries technology driver pairs and let's collect up to 10 projects per country. Then we're going to look at where are our commonalities? So we are in the process of

doing this task two now. We've developed the selection criteria for those projects. We're starting to collect those projects. We developed again a web-based tool to define the information we're going to collect on those projects. That's over here, build and manage the project inventory. The template for (inaudible) data, so we're going to collect information on all these projects that similar so we can start to compare across countries.

This was the criteria. So it had to be a demonstration of a deployment project. It had to be supported either by a government or regulatory entity. Since this is a government to government exchange we didn't want to have only privately funded projects in here because we wouldn't really have jurisdiction over those projects, if you will. So we're in the process of collecting those projects.

And this is my last slide I believe. And what are we going to do with that?

So again, just in summary, first we want

to take a look at what's motivating countries, what are reflective projects of those motivating driver technologies, what are the commonalities then across countries so we can focus in on those specific projects and boil it down to about two projects or so per country that we track in earnest, we do cost-benefit analysis on, we use some other analysis tools on to really start comparing success around the world with these projects.

So that's where we're at. Let me pass this out before I forget here. So again there's 10 copies of these. And take one if you want one. Don't if you don't, obviously. And if we're short, we will get you more.

So before I turn it over because I think we only had minutes, right?

MR. COWART: You can take a question if you'd like.

MR. LIGHTNER: The subcommittee's probably received this. This is a smart grid system report draft for this year. And I just

wanted to give a little advertisement for it that I think you've already received this and comments are due by the end of the month or something like this. And this is very important because our deadline at DOE is the end of the calendar year. And I can tell you, it's going to take us a long time to get through that process just because there's a lot of people that review it. And it's kind of that time of the -- it's silly season, as Michelle says, and it's hard to get things through the normal review process as it is.

So we really appreciate your input on this. It's the third one that we've done. It's a report to Congress that we do every other year. And we are required to get comments from you all on this as well as the task force that I lead.

So I'll leave it at that and, hopefully, I stayed within 10 minutes. Wanda?

MS. REDER: You did.

MR. LIGHTNER: And I'll turn it over then to Joe. You're next, right?

MR. PALADINO: Okay, thank you. I'm

going to give you a very brief, quick update on where we are with respect to result from the smart grid investment grant program. We have spent a little bit over half of the money to these projects, projects of the smart grid investment grant. Again, a lot of that money is going to supporting deploying advanced meter infrastructure, smart meters, and all the underlying communications infrastructure, et cetera, about a quarter of the money is going toward distribution automation technology. That includes technologies to improve reliability but also technologies to manage voltage to greater levels as well as equipment health monitors. And the third and the remaining area is going to putting phaser measurement technology, SynchroPhasor technology in transmission systems.

We've been collecting results for about a year from some of the projects because they're still, again, in the deployment phase and it's going to take a while really to see results coming out of this. But there are a few projects that

are reporting results. In fact, we've got two reports here which are in their final draft review phase in DOE. One is on peak demand reduction as a result of implementation of AMI and pricing, et cetera, and the other one is on reliability improvements. We will get these out. Following these are reports that are going to be on volt var management as well as operational efficiency improvements in AMI. And we'll send these reports to you directly by mail. We have a mailing list. And they'll also be on smartgrid.gov.

One thing that we're finding is these projects are -- when you take a look at one project there are many, many subprojects. We going back to each of the recipients to really fine tune what information we can get from them. So we're going to not only be getting quantitative information in the form of impact metrics. We're also going to be getting reports, technical reports from them so that we can actually wrap some words and explanation around the numbers. All right? And we're in the process of doing that

right now.

I'm going to go very, very quickly through these different focus areas. There are 62 projects that are deploying AMI with pricing and/or with customer systems. Thirty-two of them are offering pricing. Most of this is at our pilot projects. They're trying to decide, A, how is pricing working? How is AMI functioning and are they really going to move forward to deploy this technology across their systems? Some of the projects we're working with have actually had deployed these pricing programs across their systems but their enrollment rates are very, very small.

We have three reports that we've been looking at: One of them from Oklahoma Gas and Electric, another from Marblehead. These are consumer behavior study reports. These are on the website already. And the third report from Sioux Valley Energy is also on the smartgrid.gov website.

And I mentioned the results that we're

seen from OG&E, and they're getting significant peak demand reduction. And, in fact, they're going to be rolling out their pricing program across their territory of about 750,000 customers. And if they do that and they expect to get a 20 percent enrollment rate, they're expecting to defer about 210 megawatts of peak demand across the system. That's very, very significant. That's equivalent to a pretty large peaking power plant and so they hope to defer that.

Marblehead has done an interim study. Now they're going to proceed to continue their study. We expect to get a final report from them next year. Again, they're getting significant peak demand reductions. Sioux Valley is getting significant peak demand reductions. Peak demand reduction is really important for these folks because, for instance, we took a look, Sioux Valley shared how much they were paying for electricity. And if you take a look at what they're paying across every hour of the year there are 18 hours where they're paying 10 to $25 per

kilowatt hour. So it's really, really important for them to really reduce peak demand.

And what's interesting also to put this a little bit into perspective is Sioux Valley is expecting to get 20 percent peak demand from direct load control. And the extra 5 percent they're trying to squeak out by applying these pricing programs.

Some of the takeaways from these studies are you get -- we're seeing greater peak demand reduction from the application of programmable control thermostats, things that are control technologies. We're seeing greater impacts from those that are opt-in customers rather than opt-out customers, which really suggests that effective recruitment enrollment of customers into these programs is an effort that these utilities -- many of the utilities are taken quite seriously. And if you take a look at, for instance, at what SMUD is doing, they have very, very in-depth, comprehensive customer engagement program to really try to improve the participation

rates of customers in these programs. But they are an effective way for reducing peak demand.

Twenty-five projects of deploying advanced volt var control technologies, 11 of them are applying the technology to reduce peak load. In fact, there's a utility which is trying to reduce peak load by 200 megawatts across their system and this is by deploying on automated capacitor banks. Seven of the projects are trying to effect greater conservation voltage reduction. When you take a look at these projects there are a host of integration and control schemes. So some are going to be deploying distribution management systems to try to create centralized control of these devices out in their circuits. Some are looking at distributed control. Some are looking at implementing both of those things. There's a lot of effort to really try to integrate and work distribution management systems. But not all utilities are going to be going down that route and a lot of utilities are going to be trying to assess the effectiveness of that technology. And

fewer sets of these projects are actually using meter data that will be fed in then to their volt var control strategies, okay, to give the utility a better sense of end of the line voltages so they can better set their voltage profiles on their circuits.

So here's an example. Again, Oklahoma Gas and Electric is implementing a control algorithm to set voltage levels on their feeders at the substation. They're perfecting this control algorithm. What it will do is again it will set the voltage level at the head end of their feeders. They're applying smart meter voltage data to really determine how that control algorithm works. They want this capability to turn on when their price of electricity reaches 22 cents per kilowatt hour. That's when the system will kick in and they will start to implement peak demand reduction on their feeder. So far they've achieved 8 megawatts of reduction. They've achieved 8 megawatts of peak demand reduction on 50 circuits and their goal is to achieve 74

megawatts of reduction.

So the takeaway from this is that utilities are really trying to implement either customer-based programs or direct load control type programs or even methods to reduce peak by bringing voltage levels down to really reduce their peak level of electricity usage. And that leads to much greater enhanced asset utilization.

Forty-eight projects are applying distribution automation technologies to improve reliability. Forty-two of them are deploying automated feeder switches, either one to three per feeder. The projects are ranging from deploying thousands of these to deploying one. We're seeing improvements in reductions in the frequency and the duration of outages as a result of this technology. So far we've got initial results from 4 projects representing over 1,000 feeders for over a year.

One thing that I did want to mention is that we're going to be taking these reports, we're going to be going back to the recipients. We're

going to be working really closely with recipients over the next year to really try to enhance the kind of information that we can provide in these reports.

We're getting operational efficiencies from the application of AMI. We're seeing over the 15 projects that we have data from, we're seeing 36 percent reduction in operating costs, a lot of that is from reduced truck rolls.

Some quick observation is for rural utilities they're able to minimize to a very large extent how many people they need to send out into the field to do meter readings and also to do remote connects/disconnects. And for those larger projects they're really reducing their staff in this area to about 10 percent of the levels that they needed before. There's one very large utility that told us that they were saving $50 million a year because of the operational efficiency improvements due to just AMI.

And then the last slide, Chris, and thanks for being patient, is there are 10 projects

that are deploying SynchroPhasor technologies. The Midwest system operator has a little bit of information on them here, but they're going to be actually applying data from their SynchroPhasors in their operations room. And one application is going to be to better conduct their state estimation processes, to do it in a dynamic way. And that will allow them to increase the amount of electricity that they can push across their lines. Okay? And then they're also going to be applying in their control rooms after-the-fact event analysis to really help them understand, to take a look at the signatures, the information coming from outages, and to be able to put in place the technology, the approaches to reduce disturbances on the system.

And that's what I have to say. Thanks.

MR. IRWIN: We're trying to keep to the times so that you guys have all the luxury to pursue the other things that you're working on here.

My name is Chris Irwin. There's an

enormous amount of work going on inside of OE across the grant projects, across the R&D portfolio and everything. I have some of those smart grid grants. And so what I want to talk to you about today for just a few minutes is just three things: Work on those smart grid vendor ecosystem analysis, some potential economic impacts, and the participation that we've had on the green button data access initiative and open energy data.

In 2010, we went about working to take a look at the smart grid vendor ecosystem because it's under such transition right now. And so what we found from that analysis in 2010 is that because of the emphasis on AMI, the AMI companies themselves were acting as a nexus for making the smart grid happen at the utility vendors. This is in a constant state of flux. And so we're seeing AMI become more of a stable and predictable technology. And so you're seeing a thrust in smart grid projects going toward heavy operational emphasis, looking at analytics and looking at new

ways. And so we wanted a way to look at the smart grid vendor landscape and then use that insight to guide our own agenda and to help others guide there is as well. We needed a stable reference frame to look at organizations, to look at issues. And so what we worked to do is to combine the NIST conceptual reference model, which has all of your traditional looks at the market, with a little bit more of an esoteric approach, which is the GWAC stack or the grid-wise architecture council's interoperability framework.

As you can see this one is very much an informationally focused model for looking at any action that you have in the smart grid. It goes from the bits and bytes up through a communications network, into the core business operations of the energy enterprise, all the way up to the economic and policy. So what we're hoping for is that you can get a differentiation. If there are vendors competing in the distribution landscape you need to be able to differentiate Cysco from S&C. Both of them do networking. Both

of them are in distributions. They have nothing to do with each other in many respects.

And so we worked to combine these and take a look using that classification scheme to look at the smart grid vendor ecosystem. We identified about 580 organizations that were candidates for that and after a filtering process we came up with nearly 400. After taking a look at those companies we classified them by this taxonomy that we've created, and then started to map the relationships between the organizations.

One of the things that peaked our interest the first time through was when GE wins the business there's a whole constellation of organizations underneath GE that accomplish the work and gets it done and gets the smart grid in place. And so we cataloged the relationships between partners, and we came up with over 1,600 relationships to start looking at it. That's an awful lot of information. And so what we have begun working on is now putting this into a visualization tool. And in this case what you see

is the elements of the taxonomy, both from the NIST and the grid-wise and the companies themselves. And so this is how you see how companies work together and partner to deliver smart grid solutions. And so obviously just from a context space people can see where they fit in. People can see who they need to partner with to deliver value to utilities. And so I think it's going to be an interesting tool. We're just in the process of completing the analysis on the companies. And our next step is actually to look at our R&D agenda, which, of course, has a fingerprint on the exact same taxonomy and see where we fit. And so we're eager to develop this and move this forward.

One of the parts of that vendor ecosystem analysis is, of course, our investments through the Recovery Act. We would like to see what the economy-wide impacts of the smart grid investments are. It's not a simple thing. But we would like to see how the funds flow to the vendor ecosystem, how it flows to their supply chain, and

how all of that benefits the general economy. Like I said, it is not a simple thing. And there are two portions of it. We have a dual mission of stimulus and building the smart grid. And so at this point we're really focusing on following the dollars through the investments. This is the stimulus impact and this is the longitudinal benefit of having a smart grid, benefiting from increased reliability and things like that, pardon me.

So I think what we're looking for is that right now we're taking a look in this analysis over the coming months and weeks as what is the immediate impact on the economy. What Joe Paladino's work is focusing on is the long-term value of the smart grid. And so both of those combined is what's going to deliver the total picture. But we're very interested to pursue this because after our money is through, we're going to be relying on private sector and states to continue advancing that agenda.

A third part that I just wanted to touch

on, of course, we're jumping across a topic little bit, is green button and open data. We have a lot of jobs in OE, and so we have to be a little bit flexible. This is DOE, OSTP, and MIST, and EPA as well, and a couple of other organizations working on making energy data more available, whether it's in a government database or to standards we can encourage the private sector to share data. The green button is certainly a highlight on smart grid data and on the industry itself, is that is a common format for consumers to get their information and to start to use it. It really is the beginning of the value proposition that lands directly in the customer's lap.

We've had some tremendous successes with adoption throughout the industry. So now we have 36 million homes and businesses are going to be receiving their information in a common format. What it means is anybody who develops an application that looks at the data and helps customers, helps businesses, is going to be able to address 36 million customers no matter what

they do. So it's very exciting.

We held an Apps for Energy contest around that. It was the highest amount of attention ever on a government energy -- a government applications contest. We had 12,000 people at the end of the contest voting and we had 58 applications developed within a 5-week period. It was really amazing. But I always see this as just the beachhead. Once that consumer data is there and they can see the value in it, the smart grid is producing 1,000 times the data deeper into the enterprise, and we hope that that can be a successful business model for everybody.

We're, of course, copying the consumer data outwards into energy and open data in general. And that was on the interestingly named Energy Datapalooza anchored by Chief Technology Officer Todd Park and Secretary Chu. And that was a very exciting time focused on innovation and entrepreneurship. And Eric, of course, is going to be leading the energy data privacy multi-stakeholder process that's wrapping up this

fall.

So I think at this point if you have questions for any of us, we would welcome them.

MS. REDER: Actually, Rich, Wanda here. Clark has to run and we've got a couple of other smart grid discussion topics, one of which is the whitepaper. If you guys don't mind just holding for a bit and we give Clark just a little bit of time.

To give you guys some background, the whitepaper for the smart grid fees focused on outreach. Through that discussion there was some recognition that we needed to be looking at the technology portfolio for smart grid going forward. And there was, of course, a lot of attention to the consumer acceptance part. So there's a recommendation for two papers that will follow on to the outreach part after this. This is teeing up work for 2013.

And with that, Clark, can you just give them a little bit more background on technology?

MR. GELLINGS: Thank you. Clark

Gellings from EPRI, if I may, Richard. Thank you.

So the discussion, you've framed it nicely, Wanda, and thank you for giving me the time. The subcommittee's done great work and the paper that you'll be discussing in a minute I think is an example of that. DOE's doing some terrific stuff. We just heard some really good examples of that. But some of us wondered what happens I'll say beyond smart grid for the moment? And what I mean is how do we get now from here to a really fully functional power system in every respect? And we've had a number at examples of that brought up already here in this last day or so of our discussions, and not the least of which was the EMS 3.0. Mike Heyeck, without elaboration, made references to power electronics. He didn't go into detail, but we're talking about new applications, local electronic devices that don't even exist as yet, advanced sensors, things like digital transformers, and the like.

And so there were some of us who felt that it might be appropriate for several members

of this subcommittee, perhaps joined with the Transmission Subcommittee, because this is not just an issue focused on only one part of the power system. What technologies would be needed to go beyond those currently being demonstrated and deployed and consider identifying the key both transmission and distribution technologies which will or may require further development and or demonstration by whomever? And so I offered to lead with Billy Ball, who conveniently has slipped away, with Billy Ball's help. And I would ask if you think this is worthwhile I'm looking for some volunteers to help me with it.

MS. REDER: That's a call for action. He wants names.

MS. GRUENEICH: I'll step up in a minor way. But if you've already got it covered, I'll step back.

In California, there is an R&D program that's run for many years. It's been renamed from PEER to EPIC. And there's a requirement that this fall triennial investment plans the filed by the

investor-owned utilities and the California Energy Commission that oversees a lot of this. That's actually going to set the stage, at least in California, but since the state is so heavily involved in smart grid it might be useful, of what's the roadmap on developing technologies that don't appear to be there? So I'd be happy if you're not already covered to make sure some of that information gets out.

MR. GELLINGS: I gotcha. And thank you for letting me disrupt the agenda.

MR. CENTOLELLA: I think this is probably an appropriate place to pick up on some of the discussion that we had yesterday. And perhaps Clark suggests that, you know, in the subcommittee we expand this a little bit beyond just thinking about technology. As I was hearing the discussion yesterday, and this was partly your comment, Pat, partly Gordon's and people's comments, you know, what the OE is really focused on is focused on architecture. And architecture implies a variety of things. I mean, if we get

down to the distribution level in areas where there's distributed generation and distributed demand response, you're talking about how do you create a control algorithm that integrates those distributed responses with potentially a nodal distribution market while at the same time as you're doing volt var optimization at a distribution level and you're managing frequency at the distribution level, all of which I don't know that we have the algorithms to do today or at least we certainly don't have them in place, and that is a complicated technology question.

There is also, however, you know, a question around data and metrics. You know, we've taken this up a little bit in the dialogue that started between EEI and NARUC about what does reliability mean in a world where there's distributed intelligence? How would you begin to measure it? How do you create metrics around resilience as opposed to just your conventional reliability statistics? And then that also plays into a set of policy in terms of regulatory policy

and other kinds of policy issues that also become part of this underlying architecture for the system.

So, Clark, I'm going to challenge us to maybe take this a little further beyond just thinking about technology.

MR. GELLINGS: I like this. Very good suggestion. And thank you for volunteering, we could really use your help.

(Laughter)

MR. COWART: (inaudible) also to lead to the work plan discussion.

MS. REDER: I just want to recognize all the work that DOE, OE is doing. There is a tremendous amount of activity that's got underway to manage these programs. And the volume that you guys are managing is just phenomenal. So thank you for all that you're doing. It's definitely recognized that you're carrying a lot of workload at the moment and doing a great job of it.

So anyway, we do have some time for some conversation and questions and discussion around

the panel, and I encourage that to occur. Maybe one question for you, since we're looking towards the future on the R&D and the EAC can do to kind of help take us from where we are to where we need to be, what are your thoughts on what would be most useful?

MR. IRWIN: Well, I think that obviously -- I mean, I don't think that we've ever spent $4 billion before. So we are producing a lot of work products across a very diverse stream, especially with Joe Paladino's work where we're rolling off these reports one after the other. We could use a little bit of flow control or sort of your input on what you think are the messages that need to be moved out most aggressively. I think that would certainly be very constructive.

MR. PALADINO: We're sitting on sort of a gold mine right now because every single one of these utilities has a fascinating story to tell, that of experiences. The technology is interesting. And I think we talked about this a lot, but I think the challenge that we have is to

be able to really share the information we're getting from these recipients and go maybe a little bit further and try to organize a dialogue with them and with other members of the industry to be able to determine, now that they've deployed this technology and now they've experienced some of the issues and hardships, what are the real R&D needs and challenges they still have? And I'm a little bit, you know, trying to connect a little bit with what has been said already, that we're dealing with systems and we're dealing with system integration and system control. And to be able to figure out what the next R&D challenges are in that arena is --

MR. IRWIN: Pat had some observations over there.

MR. LIGHTNER: Well, from my perspective, I think if we could somehow figure out a mechanism for doing some things similar to what they're doing in Europe, right? In Europe they have joint research committees across all the countries that are members of the EU, and that

seems to work very well. So they come together and they coordinate research in lots of different areas across their national labs. We really don't have a mechanism here for doing quite an efficient job as they do at that and I think we could learn about process. So, you know, it's some way that we can figure out how to come together and coordinate that research across our states, across our federal government, across the private sector, I think that would be something that would really and value and allow us to actually better coordinate and exchange best practices with the EU in that context.

MR. COWART: Pat, do we need to recognize you? Do you want to wait for Tom? He's deferring, all right. You're on.

MS. HOFFMAN: Just a couple of thoughts and questions. Sonny and I were talking and he was asking if there was any really innovative apps that have really gone into the marketplace with respect to using the green button data. And I was just wondering if you guys could comment. I know

there have been some really cool apps that have been kind of prototyped, but I'm not sure I'm aware of any of them that actually have hit the commercial marketplace yet. That's one.

Joe, we did talk earlier on asset management and predictive failure and hope for the system as another value as we look across the system as an attribute, so I just would like comments on that.

And I forgot the third point, but that's okay.

MR. IRWIN: So I'll just hit on two green button apps that came up. One of them was the winner of the Apps for Energy contest which is a startup called Leafully. And it's really not rocket science, but really it's being able to put energy into people's regular living context. So it's not about teaching them about kilowatt hours. It's about seeing if there's a way to use the standard information that's available and turn it into something that can fit into their Facebook existence and things like that.

And so, whereas one of the big web portal providers for customers is Opower, well, Leafully is doing something similar where they can take that information from the green button data, put it into a context -- in this case, they used trees because that's what triggers their customer base and that's what they like to think about -- and they can share that on Facebook. And they can challenge each other to do different things or at least share ideas on how they're saving energy. But it's really just the social aspects and then as the kilowatt hours fade, if we can continue to let people act on energy and understand it without having to go through that educational loop, I think it's a powerful one.

The other one is on the business side. Lots of municipalities that are requiring Portfolio Manager scores, EPA Portfolio Manager scores for buildings, and so there's an app developer that said you download your green button data file for at 12-month data file, it automatically absorbs it into the app, and turns

it into an automatic submission to EPA Portfolio Manager. They don't do anything innovative except make it go faster and make it easy. And I thought that was really pretty.

MR. LIGHTNER: Yeah, I might just add from my perspective one of the ones in addition to those two that I thought was really compelling was an application developed in conjunction with Central Maine Power for education purposes. So they've teamed up with their middle schools across the state and developed an application that takes green button data and uses it in an educational way for students so they learn what their home use is, what they can do to reduce, and other things. The analogy I think of is the recycling example, right? So, you know, kids learn that from very early on and now that's the norm. Well, same kind of thing. So I think if we can leverage this kind of data to develop educational applications for kids, then I think we'll have better, more efficient practices of energy use in the future by future generations.

So that application I thought was very, very interesting and it's targeted at, you know, the younger folks that are basically going to inherit the system and its use in the future. So I thought that was really good.

MR. COWART: Tom?

MR. SLOAN: Thank you. For those members of the EAC who have been on for a while, you'll recall that at our last meeting Erich Gunther came in and made a presentation about the GridWise Architecture Council and the GWAC Stack. And so I commend Chris for actually employing it because it's an extension of work that the DOE has supported.

MR. COWART: I've got a question for Joe or whoever. I apologize I missed some of the slide, so I might have missed this point. But I saw a lot of emphasis on data collection, smart grid applications, AMI applications for peak load reduction and the question is constantly asked what about throughput reduction, total consumption reductions. Have you got a summary slide on that

or is there a report you can refer us to?

MR. PALADINO: We don't. We're going to be looking at that, also. I think that if you look at the -- we don't want to neglect that, but I think if you look at the Marblehead and the OG&E and Sioux Valley reports -- there's also overall energy consumption data that also embedded in those reports because they're not only looking at kilowatts, they're also looking kilowatt hours. There's a lot -- there are tables and tables and tables that we've gone through and we can extract the energy consumption data also from those. We just didn't do it for this. But that information is there including the influence of technology, including the influence of pricing on being able to effect this, including whether it's opt-in or opt-out. Some of the opt-in customers actually do better in terms of energy consumption reduction than the opt-out customers.

So all this data is there. It's in these reports. We just need to extract it.

MR. COWART: As a follow-on to that last

bit, when you say opt-in customers maybe reduce consumption to a greater extent than opt-out customers, are you saying across the entire customer base or just across those who happened to opt- in?

MR. PALADINO: In the studies that we've looked at specifically, they look at opt-in and they look at opt-out. And in just the studies that we've got, it looks like those that are opting-in are reducing their energy consumption to a greater extent than -- and I haven't looked at the other studies across the nation to that level of detail.

MR. COWART: Okay. I wanted to understand the point because it would be logical that opt-in customers would be the people that wanted to do something.

MR. PALADINO: Right.

MR. COWART: But the relevant point would be to compare consumption across the average consumer in the jurisdiction or in the service territory in order to see whether an opt-in regime

is more conserving than an opt-out regime.

MR. PALADINO: Right. And I think that data exists but I don't have it here.

MR. COWART: Okay.

MR. PALADINO: But we will look -- we'll take that --

MR. COWART: That's one of the things that's going to get evaluated.

MR. PALADINO: -- recommendation and we will look at it. Okay.

MR. COWART: That's a question we get asked everywhere --

MR. PALADINO: Okay, that's a really helpful.

MR. COWART: -- including all the European countries that Eric was just alluding to.

MR. PALADINO: Okay. Then thank you for that. Appreciate it.

MR. SLOAN: Any -- oh, Mike?

MR. WEEDALL: So I would just follow-on to your point, Rich. I think you need to look completely at that picture because I'm going to go

back to my days at SMUD where we had 35 percent of people on direct load control. If we had been able to put everybody on that, we could have hit them so lightly, you know, and so, it's just a matter of what you're getting from one individual customer. It's the bigger the base that you have to spread, you know -- and I'll use the word "pain" in that case -- but, you know, to be able to pull that resource. So, you know --

MR. GELLINGS: Well, you make a good point that you have this goldmine of data sources and a huge number when you think about the number of meters out there, the number of customers who could be assessed, or, you know, who's data can be mined for some analytic purposes, you've really got a lot to work with.

MR. COWART: That's right. Sue?

MS. KELLY: I'm sorry. I'll make this quick, but I was intrigued by what you said about -- was it Sioux Valley?

MR. PALADINO: Yes.

MS. KELLY: That 20 percent of the

savings came from direct load control --

MR. PALADINO: Yes.

MS. KELLY: -- and you were "trying to squeeze another five from rates." Could you elaborate on that point just a little bit?

MR. PALADINO: Yeah, I don't have detailed information on this. But in a site visit that we had with them recently, they mentioned that they got most of their peak load reduction from their direct load control program. They've got a water heater and air-conditioning program and they're seeing significant peak load reductions from that. And the pricing program, they're not expecting to get as much peak demand reduction overall. The true impact is from the direct load control program.

MR. COWART: Makes sense. Okay. Anything further? Wanda, want to take us to the next step?

MS. REDER: Yeah, I'll I guess present the whitepaper at this point.

MR. COWART: Yes. Wanda, is there a

reason to keep our visiting experts for this discussion?

MS. REDER: They can be wherever they want to be.

MR. COWART: All right, but before we turn to you, basically let's pause for a second --

MS. REDER: All right.

MR. COWART: -- and thank the panel for coming and presenting. We appreciate it. (Applause) We look forward to repeated visits with results from the gold mine.

MS. REDER: Yeah, appreciate it. Thanks a lot. Chris, Eric, yep. Joe, you're staying here for support, right?

MR. PALADINO: I'm right here right next to you.

MS. REDER: Okay, great. All right, let's see here. So, Smart Grid Subcommittee is one of the EAC subcommittees and we have been working on a whitepaper. We ended up having a fair amount of discussion on what the focus should be for this year. And there's a lot of different

directions you can go, but obviously with the volume of activity of here and the lessons that are coming out of this effort, we thought the most immediate thing was to focus on the outreach and communication of the gold mine. So the bulk of the short-term discussion and what's in this whitepaper focuses on that, but it's not to say that's an end-all. That is just meant to be time's of the essence. We're 3 years into a 5-year span of $8 billion and, you know, that was covered quite nicely earlier.

So how can we extract the findings along the way and communicate to the constituencies, stakeholders and the like what's going, spread best practices, lessons learned, and the like? So that is fundamentally what we decided to do. The objective was to take on the lessons and early findings. A couple of key points that's talked about in the paper is the necessity to be accurate and portray the information as it's gathered. And there was a fair amount of discussion to not overly cheerlead and it's very important to

maintain that trusted voice that I think popped out so nicely in that survey that was done for the storage work coming back from NARUC. We really want to make sure that the accuracy piece is there. And of course this is ultimately to advance this technology and kind of scale the investment so that as we go into grid modernization, we're adopting it appropriately.

So the paper is organized around kind of background and the strategic purpose of DOE in the smart grid involvement and why this outreach piece is so critical right now. We talk a fair amount on trying to look at a way to organize the benefits in a way that can be extrapolated and rolled up. A lot of times it seems that the conversation is around technology and it takes a while to make the flying leap to the benefit piece and we think that's kind of the connection that is needed in order to effectively get to this outreach aspect and really connect with those that are interested.

We also came up with an idea on how to

matrix the information so that you could sort the data and ultimately get to a particular case study that has the benefits or protect perhaps the geographical area or utility type that would match your own needs recognizing that everybody is coming at it from their own perspective and it's a mirage of information. So how do you hone in and actually matrix this so that you can get out the right thing that can actually help you get from here to there?

So those are kind of the things behind the scenes. The first recommendation focuses on really developing a systematic process that moves from a one-way outreach and communication methodology to one that's two-way and dynamic in nature. And there's several parts to this process flow of which is defined in the paper. Part of this recognizes that it's a lot more effective to work through partners and other organizations that have communication channels established. So, to the extent that you can get the messages articulated and packaged and worked through other

organizations that are dealing with their membership base, that is much more effective and an economical way to spread the message fast and efficiently and also collect information back.

So that's really the concept that's used by the term partners. It's leveraging a lot of other organizations of which some are referenced and they are certainly not all. But it's also recognized there's limited resources and bandwidth within DOE and they can probably get further faster by collaborating with others.

The bottom piece there and in the left part that's tied to projects as focus groups, in the initial design, I understand there was five focus groups that were intended. Each focus group was designed around kind of talking about like projects. And I know the consumer behavior one has been quite active. The others maybe not as much, so -- but the idea would be to more formalize those focus groups and actually not only use them to talk about their projects, but to help them have us craft the messages going forward and

bounce things off of so they end up becoming much more active in kind of the outreach and communication methodology and the messaging going to the marketplace for that project type.

Then the communication and outreach strategy brings these pieces in together and its much broader of course than kind of just putting stuff on smartgrid.gov. There's a recognition that there's a lot of places to be and a lot of messages to get out. So packaging that in a way that is cohesive and there's a plan behind it is really that middle box. And then, of course, the methodology to drive the message into the marketplace, i.e., social media, trade articles, conferences, and of course, expanding upon smartgrid.gov are certainly examples. And the idea is that there's much more of a two-way nature in this. It's dynamic. There's going to be lessons learned along the way.

So that was the first one. The second recommendation is this concept of creating a matrix of information on smartgrid.gov and that

gets back to the idea that if you could categorize the benefits, the, you know, locations, the types of projects so that people can quickly get to the particular technologies or the types of benefits and the case studies that are applicable to them, the information would be much more useful. There's actually an example in the report that begins to lay a framework of how that might be done.

The third is identifying partners that can help get that outreach infrastructure and collaboration mechanism established to disseminate quickly and consistently throughout the industry with established communication channels.

The fourth is a recognition that there are several large broad policy types of topics that need to be explored. And this is a little more of a flying leap into the future knowing what we know right now. And it's recommended that DOE take these particular topics on. Obviously the EAC subcommittee is here as a sounding board, but our recommendation is that these five areas are

pursued to begin to establish more of a vision around where we're going in terms of how this maps into aging infrastructure, cyber, grid reliability, resiliency, et cetera.

The fifth one is, you know, getting this comprehensive outreach strategy developed that covers the cost benefits and risks expanding beyond what's there. Obviously smartgrid.gov is a great platform and it can be further leveraged, but then there's other components as well that can be utilized.

And last but certainly not least is a recognition that the folks that are engaged in this are up to here and that the recommendations in here are probably above and beyond the existing bandwidth and staffing is definitely an issue that should be considered.

So, in a nutshell, that's what's in the whitepaper and I definitely look forward to the discussion.

I guess a wrap-up on next steps is we owe Eric some feedback on that one report and then

I just want to make sure that the technology and what we end up talking about in consumer acceptance and other products are glued together. So those are pieces that, you know, are in flight as we speak. Comments, suggestions?

MR. COWART: I have a couple of comments but I'll defer to others on the committee. Tom, why don't you go first?

MR. SLOAN: Tom Sloan. As Wanda mentioned, there's a recommendation in there that matrices be developed to make it easier for interested parties to identify what's relevant to their needs. And I simply want to say that we spent a lot of time talking about how best to organize information because as you said, you've got a plethora of it. And, you know, the consensus was a matrix that allows folks then to link into the database would probably be the most user-friendly, for what it's worth.

MS. REDER: Pat?

MR. COWART: Pat.

MS. HOFFMAN: I guess one thought that I

would have is who is the audience for a lot of this outreach information. And at the end of the day who really needs to understand how we're driving the benefits or the potential benefits and the information around that really goes back to whether it's the utility commissions, the management boards, the investors. And so we might want to think about -- besides the consumers, I think there's two prongs to that. I think there is a consumer outreach that's necessary, but other side of it is really the state regulators and NARUCs of the world. And so I would ask you to consider that as part of your thought process.

The other thing is we did create and identify and streamline some work within the organization in creating a smart grid investment program and it seems like a very good opportunity to hit that recommendation that was already in there.

MS. REDER: Good. Yeah, on the stakeholders, there is a list and we recognized in the paper that working with the states and NARUC

bobbles up at the top without a doubt. When I commented yesterday that the survey work that's actually embedded in that storage report really gives some good insights to how to communicate with that audience. I think it's directly applicable here.

Wow, that's it?

MR. COWART: I'll toss out a couple of observations. One of the things that's missing from this report -- and I don't know, I assume it wasn't really intentional -- is the environmental connection. You know, a lot of the debates around smart grids in the states and in the service territories, you know, involve consumers who are either worried about the very local environmental effects of the meters themselves or who don't understand the environmental improvements that can be facilitated by having a smarter grid. And getting the environmental groups as allies to understand why the smart grids can be part of their agenda is actually an important step in getting consumer acceptance of what they perceive

as a potential downside.

And so where we use the phrase "renewables integration," and there's a variety of ways of viewing that, but you could view it from the point of view of a renewables generator, namely, you know, I have a commercial interest in getting integrated. But from, you know, the point of view of the public, the purpose for getting renewables integrated is to reduce the environmental impacts of the power system.

And then related to the point I made a little while ago about demand reduction, total improvements and efficiency from the point of view of customers, again, you could view smart meters, and a lot of people view smart meters as an opportunity for the power company to punish me for -- put me on mandatory time and use rates as opposed to an opportunity for me to reduce my bill because I'm going to be a smarter consumer and I have some options.

So I guess I would just, you know, look at the communication strategy from the point of

view of at least making sure that the potential environmental improvements associated with smart grids are a part of the message. And it might help in terms of outreach to explicitly recognize not just, for example, AARP as a consumer group, but also NRDC and the Sierra Club or whoever. But the point is that they're going to have loud voices in terms of what consumers will actually do with smart grids.

And, like I said, I assume this was not really intentional because I assumed that you all are quite conscious of the efficiency and environmental benefits of smart grids. But if you have that in mind, I just found three places where you could tweak this text and it would be potentially improved.

On page 4, where you have the bullets, DOE should develop a series of policy papers, that you talk about the -- basically, you're bulleting the various benefits, but it could say instead of just renewables integration, it could say renewables integration, demand reduction, and

environmental improvement, or something to that effect.

That's page 4. On page 11, just where you say consumer groups, I think the text could say consumer and environmental groups.

And I don't know the page number, but there's the matrix later in the paper that actually does include asset utilization and efficiency including end-use energy efficiency as a --

MS. REDER: Right.

MR. COWART: -- as a benefit. But if you think about it, that's missing from your list of bullets on page 4. They don't correlate. So probably you want to make those two lists correlate and I would even, as I said a minute ago, either expand the renewables integration bullet or add a bullet for energy efficiency and environmental improvement. And that's all.

MS. REDER: Okay.

MR. COWART: Sue?

MS. KELLY: I just wanted to comment and

I think maybe Sonny may want to as well. I don't have any problem with any of those changes that you're proposing and I get all of that. One thing that some of my members have found in implementing this on the ground is that the very -- how do I put this -- attributes that make this very attractive to some groups make it unattractive to others. And if you too explicitly put in the environmental issues, at least in certain regions of the country, you can develop a backlash by people who feel that, you know, there's a liberal agenda and, you know, I mean, I have the distinction of having the only member that had to turn back ARRA money because of local backlash. So I know whereof I'm speaking here.

I would just say that was one of the reasons that in crafting both this paper and the one we're now working on on consumer acceptance, we were trying to find the sweet spot in benefits that you could like no matter who you are. And that's why the Chattanooga case study at the end emphasizes so much reducing the time to get the

system back up after blackouts and benefits like that that really have no, for lack of a better word, ideological cast to them.

So, while I agree that those benefits are there and are certainly worthy of inclusion and mention, you know, I have to say that you really have to balance that carefully because you can find that, you know, you may create as many problems as you try to solve. So I just want that point out there.

MR. COWART: I get that. I guess my sweet spot would be a little more -- I would emphasize efficiency. I have no hesitation selling efficiency anywhere.

MS. REDER: And there's a penumbra of the sweet spots --

MR. COWART: Right, right.

MS. REDER: -- for all those people in the room, I'm sure, but I just want to note that point.

MR. COWART: No, I get you. You know, outage restoration you can sell anywhere. Energy

efficiency and consumers saving money is pretty easy to sell anywhere and if we want to be renewables integration, I don't -- you know, maybe you're already across the line just even mentioning that. But I think we could probably come up with the right language and the right outreach pretty easily.

MS. REDER: And I just -- no, I don't have any qualms with any of the stuff you're adding. But I just want to explain, you know, why we might -- for example, in the case study, have emphasized the benefits that we did.

MR. CURRY: Sue will send you by e-mail a YouTube rant that will illuminate, at least it did for me, your views of where reasonableness line is drawn.

MR. COWART: I guess, right, let's just keep going. We understand that some of these are ongoing discussions with members of the public that will take years to resolve. Paul?

MR. HUDSON: I've got a number of former regulators and current regulators in the room so

they can comment on this as well. But there's something to be said for providing information when a decision is ripe. And absent that sort of organizational standard, it seems like a lot of the data dump becomes noise.

MS. REDER: Uh-huh.

MR. HUDSON: And so I guess I'm wondering if there's a way to account for kind of the temporal element. So, for example, Massachusetts just opened up a big proceeding and I think with the regulatory community as a whole, if the information isn't kind of provided when there's some decision- making ripe, it just gets cast aside and gets put to the background.

MS. REDER: Good point. You know, I think that we're going to have to figure out a way to have a closer relationship to understand what states have what issues coming up at what time and try and make sure that information is available in the right format at the right time. So all of that is definitely a challenge.

MR. BROWN: Merwin Brown. I've been

holding off making this comment, but I'm going to go ahead and make it anyway. But it's more of a personal observation. I've asked myself the question some time ago why the smart grid -- why are we doing it and what should we be telling others about why we need a smart grid causing me to do kind of a little study on the thing. And it resulted in a paper that goes -- I traced the reasons for the smart grid starting back in the 1960s. Due to events and trends, it started to happen to this industry and then followed it through. And I came up with probably -- I haven't counted them, but it's around a dozen reasons of why we have to have a smart grid. And that's sort of my main conclusion is, that this isn't just a nice thing or even a better thing. It's a necessary thing if we're going to keep the lights on at a reasonable cost.

And so my real message here is there is -- and this goes to Pat's question or comment about who's the audience -- there's probably two fundamental different audiences here. And so as

someone shapes the messages of what we've learned here and what are the main points that should be gotten across, I think fall in these two categories. One of them is, of course, the deployment one as those people who are going to use the technology, they need to learn what DOE's learned and others have learned about deploying the technologies particularly in this system's configuration. And so that would be one theme.

The other theme is more directed toward the consumers and perhaps the regulators, although they kind of fall in between both of those categories. They're stuck in the middle in other words. And that is, I think, probably the more subtle and a more tactful way than I've put it is. But they need to realize this is not a sort of a something that we can just turn away from. I think it's necessary. And I think that message is not really getting out to the general public or to the consumers maybe because I'm wrong. But I don't think so.

I just think if there is some backlash

and if that backlash were to be able to gain some foothold and start having a really negative impact and setting back the smart grid deployment like happened with deregulation in a state I won't mention, you know, I think that could be a very serious problem for us. So, for what it's worth, those are my comments and suggestion of some fundamental themes on this subject.

MS. REDER: In the paper there's certainly recognition that, you know, the smart grid findings that we're running into today, making the connection, the grid modernization and economic viability, that message needs to get out loud and clear and we have the opportunity to help bridge that message. So it's really important to do so. And that is really kind of the frontrunner, that sets the context of the whitepaper. Good point.

MR. SLOAN: Yeah, our Smart Grid Committee had extensive discussions as you expect on who the target audiences were. And sort of the follow-up on Merwin, you know, the customer who is

unhappy with a utility calls Rebecca or me. And so educating us to the realities becomes very important. I mean, Sonny is also included in that. And we were also very careful to recognize that smart grid, smart meters probably will reduce energy consumption, not necessarily utility bills. And so, I mean, particularly when we're talking about the need for infrastructure replacement and build-out and, you know, all the technology costs more than the stuff we had before. So we were very careful not to say in the advocacy part, people, you will have lower bills. You'll have lower consumption.

Then I moderated a panel on the opt-out contingent of people who have smart meters for the UTC, Mike Oldak, and had representatives from five commissions or utilities from Maine to Southern California. And we found that about 1-1/2 percent of the people were opting-out of having the meter. So it's a relatively small though inconvenient number. And we particularly spent time talking about a Michigan Commission staff report that had

gone through all the scientific data about radio waves and the impact it has on public health. And, you know, having the meter on the outside of the house or apartment building, you know, is a lot less of a threat than holding that cell phone to your ear for hours every day. And so I believe that UTC has put a lot of that stuff, particularly the slides and such, on their website and it might be worth looking at.

But again my two primary points, we carefully did not talk about reducing energy bills. It was energy use. And, two, the education of the policymakers and regulatory community is probably the most important aspect for DOE to look at because utilities are going to have more information. I want to be sitting there fat, dumb and happy and old when somebody, you know, screams at me over the phone that Westar Energy is trying to kill them.

MS. WAGNER: Just a follow-on with what Tom said, we have an opt-out provision proceeding before us, so I can't comment on anything and I

apologize for that because I have a lot to say. I was thinking perhaps a support group for commissioners. I've never been through anything so contentious and I've raised rates a lot in Las Vegas. But the one thing I'll -- an observation I did make is that it was refreshing to be reminded of what the original intent was and Merwin, your background just now was kind of a helpful reminder because all I hear about is how I'm trying to kill people.

So, thinking back to grid modernization, I think is a theme that regulators need to get but sometimes the utility -- our utility is just saying, hey, this is a great cost- savings mechanism for us. And for them, because they're in between rate case cycles, they're going to make money on it. So that's not perceived well and you have the contradiction between saying, you know, work force deployment, new types of work forces, yet we just laid off a tremendous amount of meter readers. So those things are hard to explain. And then when I get through with this proceeding,

I'll have a lot more to say about it.

MS. REDER: All right. We'll count on that.

MR. COWART: Further comments or discussion? Paul, your point -- I squelched your point?

MR. CENTOLELLA: It's fine. I was going to respond to Paul that I -- I mean, one of the discussions in the committee was not just that information has to be timely, but it also has to get into proceedings. And so, you know, there was a lot of discussion about how can we relate to commission staffs who are oftentimes going to be the vehicle rather than DOE itself for getting material into proceedings and that's an important connection to make. Not always an easy connection to make so we talked a lot about how one might do that.

MR. CURRY: Just a quick comment. The sub- subcommittee dealing with consumer acceptance has addressed a number of the issues that we're now kicking around and got into it enough to watch

the rant and to see some of the other things that are going that may be unhappily reminiscent of what you're going through in Nevada. But we have given it some considerable thought as to what the best sells are, what are the obstacles and wisely that was not part of today's buffet because we've already overeaten. But that's coming your way in the next round in March.

MS. REDER: Rich, you referenced a table on page 15 and one of things that we thought would be helpful to make the connection to the grander objectives of this is to organize material by benefit. And not only does it help with the messaging, but we believe that by organizing material this way, it also will help us figure out what the portfolio is doing in terms of achieving overall objectives. And I think that right now if we look at it -- we had a fair amount of discussion and it seemed like often we take down this technology path and then it translates into benefits. But oftentimes the ones that we're trying to make a connection with think in terms of

benefits first.

So we were trying to suggest that if there's a way to organize the material, that might be a mechanism to make the better connection in the outreach part.

MR. COWART: That also helps to rebut the argument sometimes heard that smart grid is just a bunch of vendors trying to sell technologies. And so it's all about technologies instead of all about why are we doing this. So I absolutely agree with the subcommittee's approach to organize it around benefits.

MS. REDER: Okay.

MR. NEVIUS: Just one more. I think the paper could be improved by adding another example of benefits. The one that's in here is basically a distribution automation example using advanced metering and so on. But there are other categories of improvement, including, you know, improvements to customer use of electricity. That could be cited. And I know there's a website where a number of examples are listed. And maybe

a second type of example would be helpful here to show this is one that's not a customer opt-in or opt-out. If you automate your distribution system using an automated loop scheme or whatever way you do it, the customers in that distribution network are all in. But there are other programs where they could opt-in or opt-out of specific programs. But an example of one of the other types would be helpful.

MS. REDER: Okay. Any other discussion? Oh, here's Phyllis'.

MS. REHA: Thanks. I just wanted to say that, you know, besides pointing out the benefits, it's going to be really important to quantify those benefits. And I think if your audience is the regulator, that's what the regulator is looking for, a quantification of whatever benefits have been shown in demonstration projects. And I know that Bob and I are working the customer acceptance piece, the regulatory piece, and having some kind of EM&V, some kind of measurement program to quantify the benefits that have been

shown by the pilot projects or other information that we have on the technology I think would go a long way of convincing regulators that this is worth focusing on and adopting policies to push that forward.

MS. REDER: Good point. In the interest of approval for the day, I wonder if we can reference the case studies that are already on smartgrid.gov? Otherwise, timing-wise, I'm not sure what that does to us.

MR. COWART: I'm just trying to process your recommendation and your response. Because this paper isn't really intended itself to be a public document, I mean to influence the public, this is a recommendation to DOE. So this is really an internal kind of paper. And so if that's the case, just referring the case studies that are already up and available would be adequate and so that's where I'm pausing. And, therefore, we wouldn't need to sort of rewrite the paper and go back -- or come back in March.

MS. REDER: Right. But part of the

challenge is there's so much in motion right now that we think taking action on some of this sooner rather than later is really important. We did cite that one case study because we thought it was the cream of the crop in terms of articulating benefits. And there's others out there but probably not as well done. So, we were trying to set that as the bar for what could be. Anyway, that's why there's one. We did look for others but there wasn't others that really came up to that caliber.

MR. NEVIUS: As I said, it's basically a distribution automation example. My former utility embarked on this at the urging of the state utility commission some years ago where they automated their distribution system so they could isolate faulty segments and get the rest of the segments back online quicker. That's what this does. It does it with some new equipment but PSEG, which is the utility I'm talking about, partnered with Schweitzer Engineering to do this in 2010. And they automated their system. So

there are a lot of examples of this. And maybe what Rich is saying is just the reference to the DOE website is enough without a specific example. But it's up to you. I mean if you leave it in, it's not a problem, but there are a lot of other types of examples of other savings or other improvements that are in that database or on that DOE link. Maybe just leave it at that.

MR. COWART: You can make your point.

MR. POPOWSKY: Well, you know, I just remember one at the end. We did add a sentence on page 18 after we discussed the Chattanooga appendix. We said additional case studies for nearly 20 ARRA-funded projects can be found on the DOE smartgrid.gov website. And then we give the site. So I think we did try to do that.

MS. REDER: Yeah, good point.

MR. COWART: So, Wanda, I take it that you're prepared to advance this paper for final approval.

MS. REDER: I am prepared to do that, yes.

MR. COWART: And do your colleagues have a motion to -- that we do that? Tom?

MR. SLOAN: One thing to take into account, what Phyllis was saying, recognizing a lot of that's going to show up in the next iteration, where we're talking about the matrix, I think we could put in a statement in a box that says, you know, quantification of the value, if you will --

MS. REDER: Okay.

MR. SLOAN: -- or estimation. I mean, that would at least be a placeholder for that second paper that's coming down the line. And with that, Mr. Chairman, I would move that we adopt and recommend this to move forward.

MR. COWART: Right.

MS. REHA: Second.

MR. COWART: Second. And is there any further discussion? I believe it's understood that the suggested amendments -- I think there are four of them that I've kept track of that we've discussed here today will be included in the final

document. Right.

MS. REDER: Yes.

MR. COWART: Any further discussion? All in favor?

GROUP: Aye.

MR. COWART: And are there any opposed? All right. It's adopted as amended. And I should say with respect to this document as well as the others we've done this with today, the final, final document will be circulated to everybody on the full committee so that there's no question as to exactly what document we've adopted today. And they'll also be posted.

You have one more topic, right?

MS. REDER: Yeah, Mike's going to talk about the consumer acceptance piece. Just to refresh, as we got into this, there were the technology and the consumer acceptance themes that bubbled up, so there's been an outline that's been prepared with the intent that it'll be a 2013 deliverable.

MR. COWART: Mike?

MR. WEEDALL: So, first of all, I just want to thank the other folks, some of them who I've already pointed out that they got drafted into this process, but, you know, Susan has been helping us, Mr. Curry, who just left, Phyllis, and, you know, certainly Wanda. So it's been interesting.

And just to elaborate, as Wanda was just pointing out, we decided to do this fairly late in the process so we just didn't have the time to push the paper along as we would have liked to. So today instead we bring you this detailed outline which is actually pretty detailed. And we're just again looking for input over the next few weeks from folks as far as what did we miss, do we have the right tone, you know, the draft recommendations, the right ones that we should be moving forward.

So the outline again was cited -- oh, okay, great. Yeah. Thank you, Paula. You're trying, you're trying. As was mentioned before, some of the topics that were brought up on the

health, the regulatory issues, privacy, cyber, you know, investments, you know, that utilities are going to have to make and impacts on rate design that will be covered in the paper. So we think -- you know, again, per Sue's good guidance to us, find that right tone that we can bring forward.

Just one thing I just want to offer before I just cite to what the draft recommendations are going to be, and this is just a standard rant that I have been going through for quite a while now. You know, the electric utility industry, and I was certainly a major, you know, part of this, we are just terrible at knowing and talking to customers. I mean, it is just amazing to me, you know, that the industry can be as successful as it is in spite of itself. And I think that one of the things I feel most strongly about in this paper is that there is a great need for the utilities to start to figure out how to talk to end-users in ways that they understand and, you know, they're going to value. And I know we talk amongst ourselves and, you know, we're

just great that way because we understand all the economic arguments, et cetera. Then when we go out and we just wonder why it doesn't resonate with end-users, you know, duh. And so I will stop there, at least on that point.

The draft recommendations, you know, one, Pat, you know, does recognize who the audience is for this, that, you know, it isn't DOE itself, but do we think DOE's got a key role at getting the information to, you know, whether it's legislators, regulators, helping, you know, to take these -- find those utilities that are being successful at communicating with their customers and sharing those lessons, particularly ones, you know, that go across from region to region? It also, you know, concluded that one approach to this isn't going to fit the whole country. You know, when you come up to the Northwest, it's a little different than if you're down in the Southeast. And, you know, those regional differences really need to be recognized and you need to, you know, work as best in each region.

There's certainly building those alliances, that networking with the type of organizations that Rich was citing a moment ago. You know, that's a real critical way, you know, that again we need to get better communication and get the results from end-users. And, you know, again, that we recognize that there's a need for the materials for the lessons learned, et cetera, you know, to be recognizing that you have issues today with consumer acceptance of smart grid, there's going to be a different set of issues 5, 10 years down the road. And we need to be, you know, keeping that perspective.

So, again, I look forward to comments. I see an e-mail that a couple people have already shared some thoughts. The idea would be that we come back in the spring with the revised paper. Questions, comments?

MR. COWART: I actually only have one fundamental comment which has probably been made by all of you in one context or another which is it's illustrated by everybody holding up their

cell phone or whatever. It's like I like my iPhone not because it's smart. I like it because it has applications that I want to use. And we're trying to sell smart meters to customers without applications that they actually want. So it ought not to be a surprise that that's a hard sell. And I would recommend that when we're thinking about explaining the benefits of smart grids or various smart grid applications to people that some of it is just stuff that they want to know exists if we have better, you know, grid- based technologies that reduce outages and improve efficient operation of the grid. Then they can just accept that I suppose.

But for the smart meter in your home, what's the benefit unless there's an application that is demonstrable. So we need to accept that that's the starting point for most -- actually anybody in sales. And, therefore, we need to distill from the DOE enormous database -- the goldmine is figure how to put something on the table that customers actually are interested in.

MR. WEEDALL: If I could just elaborate, Rich, you know, Comcast out in Portland is now marketing home energy management service. And when you watch the commercials, there's nothing on there about saving energy. It's all about making sure that the lights are on when your children come home from school. It's making sure that when somebody, you know, comes walking around your house that shouldn't be there, you know, that the lights come on, et cetera. So, you know, I mean, yeah, you could -- I just think the way that they're marketing it just reinforces what you're saying.

MR. COWART: Are there other comments (inaudible). Is there an action needed right now?

REPORTER: Turn your mic on.

MR. COWART: This is information for the committee and an invitation to submit comments.

MS. REDER: Correct. Yes.

MR. COWART: Okay. And is there any further action for the Smart Grid Subcommittee today?

MS. REDER: No, no more action.

MR. COWART: This concludes your report?

MS. REDER: Yes.

MR. COWART: Congratulations.

MS. HOFFMAN: I have one request for the subcommittee as they look at this. In as we're doing our benefits analysis and as we're looking at our projects and evaluating the benefits, especially for the recovering commissioners in the group -- is to look at it and say are we missing anything in how we're analyzing this information? Is this repeatable? Is this replicable? Is this, you know, valuable to how the commissioners would look at this data? Is it meaningful, you know, from the different audiences' perspective? If we can take a hard look at some of our analysis of what we're doing, especially on kind of the verification and evaluation part, you know, maybe go through and say is there something that could be standardized out of this, I would appreciate the feedback on. Doesn't necessarily have to be in the report, but just to think about that as you

go through.

MS. REDER: Okay. We'll definitely be glad to be a sounding board for you. And furthermore, to the extent that there's those of us around the table that are in different potential partner organization, we'd be glad to help facilitate relationships if that would be useful.

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

MS. REDER: Thank you.

MR. COWART: -- Wanda and Joe. I guess I should note for the record that no member of the public has asked to speak to the committee this afternoon. And, therefore, we can use the time on our agenda otherwise and we may be able to adjourn early. I wanted to make a couple of announcements and I think maybe there may be other closing administrative announcements to make.

We asked each of the new members of the committee to indicate which subcommittees or working groups they were prepared to work on. And

I just wanted to let everybody know -- not everybody's here, but just to let everybody know how that sugared off, as we say in the Northeast. Chris Shelton will become a member of the Storage Subcommittee; Linda Blair, the Transmission Subcommittee; Chris Peters, Smart Grid Subcommittee and the Workforce Taskforce; Paul Hudson, Smart Grid Subcommittee and the Transmission Subcommittee; and Denny McGinn, both Storage and Transmission.

So, subcommittee chairs, just to be aware of that. I think you already are, but I'm just sort of confirming for everybody's benefit the assignments for the new folks.

Any closing comments? I think we're prepared to adjourn. Elliot, any announcements you need to make? Everybody knows when and where the next meeting is going to be. We already did that. And I'll just simply pause for -- I'm sorry? Oh, Tom?

MR. SLOAN: Yeah, thanks, Rich. And, Elliot and Paul, would you please send out that

set of slides again? I'm sure I've got it somewhere, but I've got all those other reports and drafts and stuff like that. And it'd be easier to find it anew than to try and go through my emails so we can comment on it. Thank you.

MR. COWART: Right. I will once again thank and congratulate the subcommittees and the working group for terrific work and everybody for putting their pencils to the paper today to get those documents in good shape to be approved by the full committee and to everybody else for terrific conversations and dialogue. I will accept a motion to adjourn.

MS. REDER: So moved.

SPEAKER: So moved.

MR. COWART: Unanimously moved and seconded and approved.

SPEAKER: Thank you all.

(Applause)

(Whereupon, at 3:32 p.m., the PROCEEDINGS were adjourned.)

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CERTIFICATE OF NOTARY PUBLIC

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I, Irene Gray, 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.

(Signature and Seal on File)

Notary Public in and for the District of Columbia

My Commission Expires: April 30, 2016