

UNITED STATES DEPARTMENT OF ENERGY

ELECTRICITY ADVISORY COMMITTEE MEETING

Arlington, Virginia

Wednesday, March 12, 2014

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P R O C E E D I N G S

(1:12 p.m.)

MR. COWART: Good afternoon, everybody.

I'm Richard Cowart, the chair of the committee, and it's a pleasure to be here today with you all in person. It seems like it's been a really long time since we were all actually physically together for a meeting, so I am looking around and appreciating this. And it occurs to me that we should probably begin just by going around the room and letting everybody introduce him or herself. We have some new members here, and it would be good to hear from everybody. I'm thinking of starting -- including Carl, right. So let's start with you Carl, a new member.

MR. ZICHELLA: There we go, one of those rare times. Carl Zichella, with the Natural Resources Defense Council.

MS. WAGNER: Hi, Rebecca Wagner, with the Nevada Public Utilities Commission.

MR. VAN WELIE: Gordon Van Welie, ISO, New England.

1 MR. TILL: David Till, Tennessee Valley
2 Authority.

3 MR. SLOAN: Tom Sloan, State of Kansas.

4 MR. SHELTON: Chris Shelton, AES.

5 MS. REHA: Phyllis Reha, former
6 commissioner from Minnesota, now with PAR Energy
7 Solutions.

8 MS. REDER: Wanda Reder, S&C Electric
9 Company and IEEE.

10 MR. ROSENBAUM: Matt Rosenbaum,
11 Department of Energy.

12 MR. MEYER: David Meyer, Office of
13 Electricity, Department of Energy.

14 MR. POPOWSKY: I'm Sonny Popowsky. I'm
15 a retired consumer advocate of Pennsylvania, and
16 I'm the vice-chair of the EAC.

17 MS. LAFLEUR: I'm Cheryl LaFleur from
18 FERC.

19 MR. MOELLER: Clair Moeller from MISO.

20 MR. MASIELLO: Ralph Masiello, KIMA.

21 MS. RALLS: Mary Ann Ralls with NRECA.

22 I am pinch hitting for Barry Lawson, but this is

1 me.

2 MR. HUDSON: I'm Paul Hudson. I spent
3 ten years as a state regulator in Texas. I'm now
4 with Stratus Energy Group.

5 MR. HEYECK: Mike Heyeck, I'm an old
6 member of the EAC, and as Matt would say, I'll be
7 expiring after June. Formerly of AEP, now on to
8 independent things.

9 MR. GELLINGS: I'm Clark Gellings with
10 the Electric Power Research Institute.

11 MR. CURRY: I'm going to speak very
12 slowly, so that my colleague can sit down. I'm
13 Bob Curry, also a recovering regulator like
14 Phyllis and others. I'm now with Charles River.

15 MR. COE: Hi, my name is Carlos Coe.
16 I'm with Millennium Energy.

17 MR. CENTOLELLA: Paul Centolella with
18 Analysis Group, and another former regulator.

19 MR. BROWN: I'm Merwin Brown with the
20 California Institute for Energy and Environment in
21 the University of California.

22 MR. BOSE: I'm Anjan Bose from

1 Washington State University.

2 MR. BALL: I'm Billy Ball, chief
3 transmission office at the Southern Company.

4 MR. COWART: All right, thanks,
5 everybody. As I said, it's really great to see
6 you here. I should note for the record that, as
7 is the custom, the conversations that we have here
8 are being transcribed, and there is an official
9 record made of these proceedings. So please keep
10 in mind that you are being recorded for posterity,
11 and the good news is that the wise things that
12 members of this committee say, can actually be
13 retrieved later. And this is a true story. I've
14 actually done that. I've actually gone back and
15 read transcripts of these meetings in order to
16 pull out some useful nugget that one of you has,
17 at one time or another, actually delivered. So, I
18 don't know how often that happens, but I know I've
19 done it.

20 I was asked to say a couple of things at
21 the opening. I, as usual, want to compliment the
22 sub- committees and the committee chairs for the

1 work that they've done in the relatively long time
2 period between these meetings. A lot of work goes
3 on in the background, and the contributions that
4 you all make are greatly appreciated. And I think
5 with that, I'll ask David Meyer to speak for the
6 department.

7 MR. MEYER: Thank you, Mr. Chairman.
8 I'm pinch hitting here today for Pat Hoffman. It
9 turns out we have competing events right now.
10 There is a major meeting of the National Labs here
11 in town, called by our under secretary, and we
12 wish it weren't happening simultaneously with this
13 meeting, but that's the way it is.

14 So, at any rate, first, just some
15 general news about things at DOE that are of
16 interest to you. You've heard before about the
17 grid tech team. Well, tech teams are -- it's
18 crosscutting teams on strategically important
19 topics are becoming more widely used and
20 acknowledged as useful at the department. There
21 are now six tech teams all under the auspices of
22 the under secretary. And the under secretary

1 convened this Lab's meeting, particularly to
2 cultivate a stronger relationship between the tech
3 teams and the National Labs. In addition to the
4 grid-tech team, there's a water and energy team.
5 There's a super critical CO-2 tech team. I'm not
6 sure I can name all six of them. But, in any
7 event, the grid-tech team in particular, I can
8 say, is getting very strong support from the under
9 secretary and implicitly the secretary as well.
10 And there is increasing interest in having the
11 tech teams provide serious input to the budget
12 process. We are expecting the onset of the 2016
13 budget in April. It starts in April and runs
14 through November, but in addition to other major
15 strands of activity that are of importance to you,
16 one is the QER, the Quadrennial Energy Review, and
17 Melanie Kenderdine, who has the lead on that for
18 the department, will be here in a few minutes to
19 give you detail on how that is to work. For the
20 moment I will say that the QER is focusing chiefly
21 on long-term strategic challenges in the energy
22 sector, but with particular attention to delivery

1 infrastructure. They expect to address generation
2 and end-use questions in a subsequent effort. So
3 this immediate round of the QER is to focus on
4 infrastructure, with particular attention to
5 transmission distribution, pipelines, and rail.
6 And presumably the QER will identify strategically
7 significant challenges and then put forward ways
8 in which those challenges might be addressed.

9 As input to both the QER and the budget
10 process, there is a parallel effort underway
11 called the QTR, Quadrennial Technology Review. A
12 few years ago there was an earlier version of the
13 QTR, so this is sort of a second round of that,
14 and we're going to be building on that experience.
15 So that will get a lot of attention from the
16 grid-tech team, obviously, or at least the
17 electricity portion of the QTR.

18 Now, one other major initiative that
19 we're working on under the auspices of the
20 grid-tech team, is one that we call our benefit
21 cost initiative, with respect to distributed
22 energy technologies. I don't have to go into

1 detail with you folks about the current debates
2 about net metering and the impacts associated with
3 wider deployment of rooftop photovoltaics. But
4 from our point of view, that's the tip of the
5 iceberg, that there are other distributed energy
6 technologies that are in the pipeline that are
7 going to present similar kinds of challenges to
8 regulators and policymakers. And moreover, some
9 of these technologies are going to be interactive.
10 If you're trying to assess, say the impacts of PV,
11 you may need to take into account, well are there
12 micro-grids? Are we assuming micro-grids are
13 going to be part of this arrangement? What level
14 of penetration of electric vehicles are we going
15 to see, and are they in some way going to be
16 interactive with the photovoltaic systems. So
17 those are just hints of the complexity of these
18 problems that lie ahead.

19 So, the initiative that we have in mind
20 is to stay well away from the policy issues per
21 se, but to focus on what I would call the
22 development of widely shared concepts, metrics,

1 methods, and tools for doing the impact analysis
2 that needs to be done. What we want to see,
3 ideally, some years from now, not too many I hope,
4 would be some widely shared conventions, analytic
5 conventions about how this analysis is to be done,
6 and try to get beyond the rather less than fully
7 helpful dialogue that sometimes goes on today.

8 The reason I bring this to your
9 attention, is that I think it is something that
10 the EAC will want to focus on. I could see the
11 group establishing a subcommittee that would tract
12 this particular project. And as this project
13 evolves and firms up, we'll keep you in touch. We
14 look forward to further dialogue with you about
15 it. You may have questions now that you want to
16 raise with me, and that's fine, I'll do my best to
17 speak to them. That's sort of the short overview
18 of major things in DOE and the Office of
19 Electricity.

20 MR. COWART: Next, Cheryl LaFleur.

21 MS. LAFLEUR: Thanks a lot, Mr. Cowart.

22 I'm very happy to be here. I just wanted to take

1 a second first of all to introduce Jim Peterson,
2 who must have been the first one here because he's
3 standing closest to the door, which everyone knows
4 is the most desirable seat in the room at any
5 meeting. Jim is in the Office of Energy Policy
6 Innovation at FERC. He has been there for a month
7 or so. Was Jon Wellinghoff's chief of staff for
8 Jon's entire terms as chairman, and then assisted
9 me in the transition to acting chairman. Before
10 that he worked for Nora Brownell and worked in the
11 general counsel's office, and every other job at
12 FERC. Although I've been the FERC liaison to this
13 group for the last couple years, and still want to
14 continue to have a presence, I realize I have not
15 done a very good job as liaison if judged by
16 percentage of attendance at all of the meetings
17 and hold the meetings, and was hoping that -- one
18 of things that Jim has been working on with Jamie
19 Simler is trying to keep an eye on the very, very
20 many ways in which FERC interacts with the DOE.
21 In connection with the meeting, I recently had a
22 matrix prepared, and there were a couple dozen

1 different people on some team or other, but we
2 don't always have the big picture. And this group
3 seemed like a wonderful opportunity, so I hope
4 you'll include him in your discussions. In the
5 meantime, I am here, and we are still working, I
6 hope, productively on a lot of the areas that this
7 group looks at, including electric transmission,
8 energy storage, new technologies and others.
9 Generally, a lot of our work right now is shaped
10 by supporting all the changes in power supply that
11 are happening around the country with
12 infrastructure work, both electric transmission
13 and gas pipelines. A lot of investment going in,
14 a lot of cases, both on rates and ROE, order 1,000
15 and other things, and also market work -- a focus
16 on the capacity markets. We're going to be doing
17 a deep dive on April 1, on what happened this last
18 winter around the country -- something we're
19 getting a lot of letters on from state regulators
20 and others. And we're working a lot on the
21 interplay between the gas and electric markets --
22 something that's very, very actively being worked.

1 Another thing just to mention, I know I've spoken
2 about it several times at this group, is our work
3 on reliability, resilience and grid security.
4 It's been quite in the news lately, maybe too much
5 in the news, but we already had done years of work
6 on working with NERC on standards around cyber
7 security. Last Friday, voted out an order
8 requiring NERC and the industry to prepare and
9 file a standard on physical security, something
10 that had been -- a lot of work has gone on
11 voluntarily across the industry, but not been part
12 of the standards catalogue. So that's something
13 we've ordered now. It's a little bit different
14 than most of our orders, in that we put it out as
15 a directive, meaning it's subject to ex parte.
16 The decision whether to have a standard is not
17 something we can bandy about. That's subject to
18 the ex parte restrictions, although it is subject
19 to rehearing and so forth. But once we get a
20 standard filed, we're going to open a regular
21 rule-making docket, and that can be debated, as
22 our normal standards are. So I'm happy to take

1 questions on anything. Look forward to
2 interacting at the break and so forth, but just
3 wanted to say hello, while we wait for Melanie and
4 the QER.

5 MR. COWART: Thank you very much.

6 Questions for either acting chairman --

7 MS. LAFLEUR: Yes.

8 MR. COWART: -- LaFleur.

9 MS. LAFLEUR: Chairman was post gender,
10 although I get called every possible variety of
11 chairperson, chairwoman, chair chairman, acting,
12 not acting, interim. I answer to everything.

13 MR. COWART: Questions for David or for
14 Acting Chair, LaFleur?

15 MS. LAFLEUR: I'm curious. Maybe this
16 is more a question for Melanie, but I think we've
17 all been hearing a lot about the Quadrennial
18 Energy Review. I'm wondering kind of what the
19 timeline is. I mean I know you're just starting
20 outreach. Is it going to be the kind of thing
21 where there's a draft, and then we have a chance
22 to react, or pieces of it come out? Has any of

1 that been planned out yet because it seems an
2 ambitious project plan. It's next January we're
3 going to have this --

4 MR. MEYER: I can' say much beyond next
5 January as the delivery target. So let's see if
6 Melanie can provide additional detail.

7 MR. COWART: I have a question for you,
8 David, which is something you said on the benefit
9 cost study.

10 MR. MEYER: Yeah.

11 MR. COWART: You said that it was
12 important, or the department had concluded that it
13 would stay away from the policy questions.

14 MR. MEYER: Yes.

15 MR. COWART: But that you were going to
16 try and focus on how to measure things. Is that
17 what I heard?

18 MR. MEYER: The notion is that we
19 recognize that the states have principal
20 responsibility in this area. And we don't want to
21 seem to be somehow trying to script things. We
22 want to give them and others the tools that they

1 need. We want to facilitate a better conversation
2 on this topic. I don't mean to say that we will
3 be totally outside the policy discussion, in our
4 view, the fruits of this effort have to be broadly
5 accepted. To me, that's the definition of
6 success, is coming up with products, a taxonomy of
7 the kinds of benefits that need to be analyzed and
8 widely accepted methods for doing that analysis.
9 I think we want to develop these products in a
10 very collaborative way. We don't want for people
11 to assume there's a DOE logo on these things, when
12 they are in final form.

13 MR. COWART: Carl, did you have a
14 question or a comment?

15 MR. ZICHELLA: Yeah, thank you. This is
16 a great conversation and very timely, about the
17 cost benefit of distributed generation. There is
18 a lot of work that's begun in the private sector
19 on it. In fact, the Regulatory System's Project
20 is doing a bit of work right now on this, and
21 Rocky Mountain Institute as well, where the
22 conversation has been pretty much about the drain

1 on the system caused by distributed generation.
2 And I think the benefit side of the equation needs
3 to be much more closely examined. There's a lot
4 of private investment that has been made -- many
5 millions of dollars from private individuals that
6 are benefiting the system. The effort to quantify
7 those has been way behind the curve. So the
8 conversation's been all about how the distribution
9 grid is being taxed, but not about the (inaudible)
10 that all rate payers would benefit from and other
11 sorts of benefits. I think that it is very timely
12 to get that done and have that conversation be a
13 lot more balanced. That way if we're going to
14 have changes -- in effect, industry is like solar,
15 for example, that the industry would feel much
16 more comfortable looking at next steps, rather
17 than digging in to protect the kinds of incentives
18 that are present now. Because we know those work,
19 like net metering, and where we would go next.
20 So, I just want to say that's especially of
21 interest and valuable to part of the discussion.
22 And along with that, something I think our

1 committee's going to be looking at, is the
2 interplay between the distribution grid and the
3 bulk electricity grid, and how they can be
4 mutually supportive to help ease some of these
5 integration challenges.

6 MR. CURRY: I guess in my customary,
7 less diplomatic approach to a topic that Carl just
8 addressed, I would point to the experience that
9 Arizona had in fighting over this issue and where
10 Public Service of Arizona initial's guesstimate as
11 to what it would cost for each solar PD house to
12 come onto the system, was somewhere between 20 and
13 80 dollars a month. And this ended up being
14 essentially litigated. There were five elected
15 Republican commissioners in Arizona, and this was
16 a tough slog for everyone involved because of the
17 effort by the utilities to quash, the incumbent
18 utility rather, to quash the newcomer utility.
19 And I would second Carl's more discreet
20 articulation of the problem, by saying that, from
21 my range of contacts in the investor and utility
22 world, they're mostly focused on withstanding the

1 onslaught from the newcomers. The newcomers are
2 not regulated. They have enormous tax benefits to
3 work with -- 30 percent investment tax credit. If
4 you price out the accelerated depreciation
5 schedule, that's another 15 percent. So coming
6 in, you've got 45 percent tax benefit for rooftop
7 solar, and that's before you hit the states and
8 before you go into net metering. All these things
9 can't be ignored, nor have I seen anyone yet, and
10 there are many proceedings underway in various
11 places, including in Minnesota, and Phyllis is
12 aware of this as well, where it's priced in any
13 way reasonably by the folks looking at it. So
14 people are doing their usual advocacy roles on
15 both ends of the spectrum. The problem is that
16 the solar people seem to be moving faster,
17 smarter, quicker, and in the financial arena, much
18 more effectively because of the constraints that
19 were placed on incumbent utilities where the
20 regulators have to deal with safe and adequate
21 service at just and reasonable prices. So
22 obviously, everyone's migrating into, hey, well of

1 course we've got to accommodate the environmental
2 world, but that's not part of our portfolio. I
3 think it's going to be very tough, David, to do
4 what you're undertaking, but I admire DOE for
5 trying to do it, and I hope that there are enough
6 people from both sides of this continental, or
7 maybe continental divide isn't right, this divide
8 at the table when you convene, and using your
9 exemplary convening power, to try to hash some of
10 this stuff out because it's also my experience
11 that, if you can get the right people in the room,
12 you can negotiate a peace treaty that works for
13 everybody. I haven't done it yet, but I'm trying
14 to.

15 MR. COWART: Yes, Mary.

16 MS. RALLS: Thank you. Mary Ann Ralls
17 for NRECA, and, David, if you could take a moment,
18 or now that Melanie's here, this might be
19 something for her, to speak just briefly about how
20 the benefit cost initiative might work into the
21 QER in terms of the product and the results and
22 the findings that might come out of that benefit

1 cost initiative.

2 MR. MEYER: Well, I think the initiative
3 has potential value as inputs to a variety of
4 future activities by the department. I think it's
5 going to open a line of R&D inquiry that we would
6 want to pursue through the labs. I don't know
7 that it would necessarily factor directly -- this
8 is really something that needs to be explored
9 after Melanie presents her perspectives about the
10 QER. And I sense that this initiative is really a
11 very long-term effort, simply because the
12 landscape is going to change as we go. New
13 technologies are going to be emerging, and so
14 we'll get one round of this thing done, and we'll
15 say, gee, we've got a lot more work to do. I
16 wouldn't necessarily assume that it's intended
17 only to fit in to any other particular activity.
18 It has a lot of merit just in its own right, I
19 think, as a contribution to the public dialogue
20 about distributed energy technologies.

21 MR. COWART: Well again, on behalf of
22 Pat Hoffman, I want to introduce Melanie

1 Kenderdine to you, as the secretary's lead person
2 for the quadrennial energy review. Melanie,
3 please -- I think better from the podium.

4 MS. KENDERDINE: Let me start by saying
5 I changed handbags today. I didn't bring my
6 glasses, and so I can't see any of you. So, I'm
7 not being rude when I don't say hello. If I know
8 you, I don't know who you are at the moment. My
9 apologies. I don't know how much all of you know
10 about this. I think, while I can't tell, I
11 suspect that some of you have heard this before,
12 and so I apologize if I am being repetitive to
13 many of you. We've been out talking about this a
14 lot, and so there is enormous interest in the QER.
15 I talked to the CEO of a major utility about a
16 week ago, and they have set up an entire team
17 within their utility to work on the QER. I'm
18 finding that in a lot of places, there's also
19 enormous internationally as to what we're doing.
20 And so we are out and about, talking about this a
21 lot. I will say also, when I go through this
22 presentation, we are working with the White House

1 on finalizing the outline and the scope of this.
2 This reflects some of the discussion we've had.
3 It's not final, and I have been assured that I
4 will get a final outline approved by the White
5 House today, and just in time for our SEAB meeting
6 tomorrow. I think that the issues that we're
7 negotiating on are not wildly different at all,
8 from what you're going to see in here. So it's
9 mainly organizational structure and some of the
10 scenarios that I'm going to be talking about. As
11 most of you know, the president put out a
12 presidential memorandum on January 9th. That's my
13 father's birthday, so it's one date that I
14 actually can remember. The president put that
15 out, and important to us in what we're doing
16 organizing the QER. This was in the climate
17 action plan, but in the first paragraph there, you
18 see that the president highlighted economic
19 productivity, enhancing our quality of life,
20 protecting our environment, and insuring the
21 nation's security. We have taken that very
22 seriously, and are organizing the QER with a

1 substantial focus on climate. That's kind of a
2 long-term focus of what we're doing in the QER.
3 There are also a number of very significant near
4 term issues that we're dealing with for energy
5 infrastructure, that have nothing to do with
6 climate. But as we go through and analyze those
7 near term issues, we always have to be mindful
8 that we are talking about infrastructure to enable
9 a clean energy in the long term. The PCAST
10 recommended a quadrennial energy review in, I
11 think it was 2010, late 2010. Not surprisingly,
12 the secretary of energy was on PCAST at the time.
13 He liked the QER. I have heard him describe it as
14 one of the many times since he's become secretary,
15 where he threw the pitch and was able to go over
16 (inaudible) and she is responsible for stakeholder
17 outreach.

18 So you'll be hearing a lot from her in
19 the very near future. And we have put together a
20 team of about 55 analysts, and the QER is not all
21 we do, but it's a big part of what we're going to
22 do this year. One other thing I would say, the

1 presidential memorandum said that this is due on
2 January 15, 2015, and so we're not quite in the
3 hysterical mode, but getting close. We've had a
4 lot of questions why we're focusing on
5 infrastructure. Many people wanted us to do end
6 use supply, et cetera, et cetera. And a couple of
7 things about infrastructure -- you can look at the
8 history of the United States and see that through
9 periods of sustained economic development have
10 been accompanied by enabling infrastructures. As
11 the president noted in his PM, energy
12 infrastructures are essential for our
13 competitiveness and quality of life. The
14 longevity of infrastructures means that decisions
15 we're making today, are going to be with us for
16 many, many decades. I read in the news clips this
17 morning, that we're going to see the retirement of
18 a 107-year-old coal plant. That's not necessarily
19 a generational infrastructure, but these last a
20 long time. I'll say a little bit more about that
21 in a minute too. The vulnerabilities to our
22 infrastructures are increasing, and there are

1 significant challenges in transforming our
2 infrastructures to enable a clean energy future,
3 and we believe that that warrants a federal
4 policy. We have very recently defined the word
5 quadrennial. The other agencies do quadrennial
6 reviews. Almost all of those other agencies, with
7 the exception of Homeland Security, these are very
8 inwardly focused documents. They are strategic
9 for those agencies' quadrennial defense reviews,
10 very strategic for those agencies and for their
11 budgets. Energy infrastructure and energy systems
12 in general in the United States, with the
13 exception of Public Power, are not owned by the
14 government, and they're not always regulated by
15 the government. DOE doesn't own these assets,
16 with the exception of the PMA's. And we don't
17 control the regulation. And so the QER is a very
18 different document than other quadrennial reviews
19 in the government. And, we have not only narrowed
20 this to infrastructure, we're doing transmission
21 storage and distribution infrastructure. RCAB
22 told us that that they thought infrastructure

1 itself was too broad, and that we needed to narrow
2 the focus. So this is going to be an installment,
3 okay? We're going to have four installments. The
4 first one, we are going to focus on TS&D
5 infrastructure. Many of the reasons I have
6 mentioned these are (inaudible) intensive. They
7 will establish our energy future, but we have a
8 2030 vision that we're looking at for a clean
9 energy future, and some things we'd like to see
10 out of our infrastructures. And in order to meet
11 that vision in 2030, we have to start within the
12 next couple of years. And so, that's why we
13 started with infrastructure, narrowing it to TS&D
14 infrastructure, and we're going to be doing
15 installments. We probably next year will do
16 supply and demand infrastructures. The third
17 year, and this is up to the White House, we
18 haven't decided either on the out years, but we've
19 talked to them about year two, not much about year
20 three. I would actually like to look at supply
21 chains. I think it is a very different way to be
22 looking at energy, and I think that there are some

1 fairly serious supply chain issues, in the
2 electricity industry for example, and what we saw
3 at Metcalf and the transformers. Critical
4 materials and other supply chain issue that I
5 think we need to look at our energy from a
6 different perspective. But that remains to be
7 seen.

8 These infrastructures have limitations,
9 and they're facing growing vulnerabilities. These
10 are the proposed TS&D systems that we want to
11 cover. These are very detailed, and I always have
12 at least one or two slides that you cannot read.
13 This is one of them, but we're going to be looking
14 at electricity, gas, and petroleum products, and
15 within those, you get coal transport, bio-fuels,
16 and that's vehicle fueling probably infrastructure
17 there. Solar and wind and nuclear -- that's grid
18 interconnection fundamentally, and some of the
19 issues you were talking about when we first came
20 in. And then CO2 infrastructure is something that
21 the secretary wants to do. Whether that will
22 ultimately stay in there or not -- it's a

1 bandwidth issue. So that's the universe, and
2 we're working at refining this, excuse me, and
3 possibly narrowing it down even further. We
4 probably will not look at nuclear waste, for
5 example. One, that is a bandwidth issue. It's
6 clearly, deeply important to the industry, but we
7 have a blue ribbon commission report that came out
8 a couple years ago. We're tracking that. The
9 administration supports that, and so we probably
10 -- you might reference it, but we probably won't
11 do much detailed work on that.

12 I mentioned limitations of the current
13 system. We have identified those. Those are
14 things that are fundamentally cooked into the
15 system already, that we just have to manage
16 against. There might be little we can do,
17 certainly in the near term, to do anything about
18 them, or it's just an issue we have to deal with
19 because of the existing physical infrastructure --
20 that's age, I'm sure the age of the
21 infrastructure. There was a call the other day of
22 utility executives, and they asked them what they

1 worried about first thing in the morning, and I
2 think it was 56 percent of them, said the age of
3 their infrastructure. And so, it's clearly a
4 problem. Cost -- you all know that cost -- these
5 are huge capital projects for transformation and
6 replacement, very, very expensive. Work force has
7 surprised me, when I started working on this.
8 Over 60 percent of the workers in electric and gas
9 utilities, are likely to retire or leave in the
10 next decade. So that's another issue that we're
11 going to have to build a limitation of the
12 existing systems. There are also short and
13 long-term vulnerabilities and those are growing.
14 Climate change -- you all are familiar with that.
15 Cyber-security -- 53 percent of all cyber tax,
16 recently were on energy installations. There was
17 one other double digit sector on that, and it was
18 low double digits, and all the rest were in single
19 digits. So energy installations are huge and
20 growing. Cyber attacks, physical threats -- I
21 need to put four. When I put this slide together,
22 there were three -- there was another one

1 recently. Physical attacks on our infrastructure
2 -- you've all been reading about that in the Wall
3 Street Journal. That's a growing vulnerability
4 that we're fearful of. Supply and demand shifts,
5 releasing the -- Bakken is a significant example.
6 It is having major, major impacts on our oil
7 pipelines and refining and take away capacity in
8 the Gulf of Mexico because so much product is
9 going from the Bakken, and where it has typically
10 gone from south to north, it is now going north to
11 south. So it's creating a lot of congestion in
12 the gulf. That affects things like our strategic
13 petroleum reserve. And the Marcellus is the other
14 obvious example. And then the growing
15 interdependencies -- Hurricane Sandy comes to
16 mind, where you say significant -- you couldn't
17 use the fueling infrastructure because the
18 electric infrastructure went down. We all know
19 about gas and electric interdependencies and the
20 growth of that there. And we actually saw a
21 little bit of it with the most recent propane
22 crisis. Propane is transported by rail, and rail

1 is transporting a whole lot of oil these days.
2 I'm going to skip over this. This is a depiction
3 of some of the results of a study we did, released
4 out of EPISA in July, on the vulnerabilities of our
5 energy infrastructures to climate change. It's
6 substantial and growing. Another -- this is a
7 huge focus of the secretary's, that regional
8 differences, not just here, but in other
9 infrastructures as well, this is generating
10 capacity under construction by primary fuel in
11 region in 2012, so this was not in commercial
12 operation in 2012. The green is solar.
13 Obviously, that's huge increases in California.
14 That big bar is California, and the small green
15 bar next to it, on the right of it, is the
16 Southwest, not surprisingly. The blue is natural
17 gas. That's nationwide. And the red is nuclear,
18 and that's exclusively in the Southeast. So there
19 are significant regional differences and that
20 affects the infrastructure. I'm going to skip
21 over that.

22 This is a little bit about how we've

1 organized our approach at this point in EPSA. I
2 mentioned the president's goals in the PM, and
3 here are our definitions of them -- economic
4 competitiveness, environmental responsibility,
5 energy security. I mentioned we have a 2030
6 vision that we are looking at, and we have picked
7 desirable characteristics of our infrastructures
8 in 2030. These characteristics may or may not
9 apply to the specific infrastructures that we're
10 looking at. This is generic, some more than
11 others, some not at all, some there's nothing you
12 can do about. Our number one is minimal
13 environmental footprint. We are going to be
14 looking at robustness and sub characteristics, we
15 would say, of that are reliability and resiliency.
16 Scalability, obviously an important issue.
17 Flexibility and within flexibility we're looking
18 at extensibility, interoperability and
19 optionality. And then affordability -- and we
20 call these our ilities, and it is obvious, after
21 what I just said, why we call them the ilities. A
22 lot of these definitions come from an MIT

1 engineering paper. And so these are engineering
2 terms, but these are things that we think will be
3 very important characteristics for an
4 infrastructure or infrastructures in 2030.

5 This is our analytical framework. At
6 this point in time, as I mentioned, we are
7 discussing and iterating on the edges with the
8 White House, but we are very close to resolving
9 that. We are in the process of putting together
10 many, many baselines. This has electricity, heat
11 -- I'm sorry -- the physical infrastructure, legal
12 regulatory financial baselines -- we're also
13 putting together, Karen's team is putting together
14 a state and local federal regulation and statutory
15 baseline, so we're doing that state by state
16 because you all are making decisions under very
17 different circumstances in different states. And
18 then the sectors that I just discussed, and the
19 near and long-term system limitations and
20 vulnerabilities that we're looking at. There's
21 our vision in 2030. We are in the process of
22 developing metrics for the characteristics, and

1 we're going to be working with our national labs
2 on that as well. I've come to what we'll be doing
3 -- scenario analyses and looking at barriers to
4 achieving the alternatives that we identify
5 through those scenarios. And this is, I think,
6 not an atypical framework for that kind of
7 analysis. These are the candidate scenarios that
8 we are talking with the White House about. We're
9 actually going to do an analysis of each sector,
10 and then we're going to do systems analysis. The
11 secretary is very -- he always emphasizes the
12 systems analysis in the title of my office, Energy
13 Policy and Systems Analysis. As you know, he's a
14 scientist on researcher, who expects a lot of
15 rigor and understands systems, and so he's very
16 interested in us doing that as well. We're
17 looking at a range of economic scenarios, starting
18 with the EIA reference case, then looking at
19 greater and lesser economic challenges, greater
20 and lesser productivity, and then technologies and
21 fundamentally we'll be looking at a range of costs
22 of the various technologies. And all of this in

1 the context also of a 40 percent reduction in CO2
2 emissions in the U.S. by 2030. Our vision is
3 2030. Our vision is 2030. That is the trajectory
4 that gets us to 80 percent by 2050, when it
5 crosses the line in 2030 it's 40 percent. It's
6 very tough to do, so we'll be looking at that.

7 And then finally, this is our
8 stakeholder outreach and engagement plan. I'd
9 love for Karen to say a little bit more about this
10 at the end of the next slide. As I mentioned, the
11 QER is co chaired by the DPC and OSTP. At DOE, we
12 -- it just reminded me of something I haven't done
13 -- we are going to be working intra-agency with
14 our different programs and the science office. I
15 haven't read our plan to work with them. We have
16 had a significant outreach with our national labs.
17 They put together 120 proposals initially, self
18 organized for the QER. We are narrowing those
19 down, narrowing those down. They have significant
20 capabilities as you might imagine, in some of the
21 modeling work that we're going to be doing. And
22 we are working with SEAB and PCAST. We have two

1 PCAST members on our SEAB taskforce on the QER.
2 So that's kind of our internal group. Then
3 external stakeholders -- I'm sorry, let me go to
4 agency stakeholders. First, as you can see,
5 there's a whole bunch of them, and we have to
6 coordinate this inter-agency. They have put
7 together at this point in time, a listing of their
8 agency equities in this. It's actually quite
9 informative to read what all of them are doing,
10 and what their statutory requirements are, et
11 cetera, et cetera. It does speak to the large
12 coordination job that we are going to be doing.
13 And then, another large part of our external
14 coordination is our external stakeholders,
15 starting with Congress, industry, NGO, state and
16 local tribes, the financial community academia and
17 the public. And Karen can say a little bit more
18 about our outreach to the public, and what we're
19 doing with websites, et cetera on that as well.

20 And then finally, we have a one-year
21 plan. A PM came out on January 9th. It's due at
22 the end of January 2015, so we have a year. We're

1 in phase one, doing the scoping work. I think
2 we're already a little behind schedule. Phase
3 two, that six-month period, where we're looking at
4 -- where we're doing a lot of our analytical work.
5 And then phases two and three, where we're doing a
6 lot of the analytical work, and then finally, the
7 internal approval process with the government,
8 which is two months here, which I think is the
9 most unrealistic part of the schedule. And
10 getting something through an inter-agency like
11 this that's so sensitive. But that will be in
12 other people's hands, not mine. And if I can get
13 them a document with two months out, I will let
14 the chips fall where they may. So anyway, that's
15 what we're doing, and if Karen can say a few
16 words, then we look forward to your questions.

17 MS. WAYLAND: Do you want me to come up
18 there?

19 MS. KENDERDINE: Yeah.

20 MS. WAYLAND: I'll do it from here.

21 Some of you have heard me talk about this, but in
22 the meantime, we've actually put a lot more flesh

1 on the bones, in terms of our stakeholder
2 engagement plans. We have been informally meeting
3 with everybody and their brother, and as Melanie
4 mentioned, there's an incredible amount of
5 interest. At the same time, we've been setting up
6 sort of the infrastructure, so to speak, of the
7 stakeholder engagement plan, which will be a
8 website where people can load comments. We have
9 developed a lengthy public stakeholder meeting
10 plan. We're proposing around 15 meetings around
11 the country, bookended by meetings in Washington,
12 D.C., to initiate this process and then to wrap it
13 up. Very shortly, in less than a week, we'll be
14 announcing the first tranche of those meetings,
15 and we envision those as very formal meetings,
16 where we have a cabinet-level official with some
17 panels of invited witnesses. But also an open
18 mike -- all of this will be facilitated by a
19 professional workshop moderator. And we'll be
20 posing a series of questions in a memo that
21 describes the topic of the meeting and will go out
22 publicly. And that will be posted on the web, so

1 that everybody can see what the topic is, well
2 ahead of the meeting schedule, and can submit
3 their own comments around the topic of the
4 meeting, or more broad comments on the
5 (inaudible). So stay tuned because very shortly,
6 we'll be making some announcements on the
7 locations -- which we intend to be very
8 geographically diverse, and the topics. We
9 probably, at some point midway through this
10 process, will put out an interim report on the
11 kinds of feedback that we've been getting from
12 stakeholders in the first part of this process,
13 probably not for attribution, but we do intend for
14 a great deal of transparency in this process, so
15 that everyone knows who we've been talking to and
16 what we've been hearing. So every comment we
17 receive will ultimately end up on the public
18 website. Every document that people submit to us
19 will become part of a library, that we hope lives
20 beyond the QER. So the intent here is
21 transparency, not reinventing the wheel, so that
22 we capture the work that you all are doing in this

1 area anyway, and that we're informed by. And
2 also, hopefully, that by engaging in this robust
3 stakeholder process, we actually build support for
4 the recommendations. So stay tuned because very
5 shortly you'll start to be bombarded with the
6 kinds of questions that we're looking for
7 responses from the public on.

8 MS. KENDERDINE: You can say two other
9 things on that. We're also going to do a set of
10 technical workshops. Those will probably be here.
11 We've picked topics, but we haven't announced
12 them. I just got approval on four on Friday. And
13 as I've been saying for the last several days,
14 I've gone from propane to Ukraine. So Friday was
15 not very long ago, so we have not fleshed out --
16 done more with the technical workshops. And the
17 other thing, we will probably have, as Karen
18 mentioned, interim products. Some of the topics
19 that we're going to be looking at are discreet,
20 and might lend themselves much more to white
21 papers, than to kind of a systems analysis or
22 modeling or even the larger analytical pieces that

1 we're going to be looking at, so something like
2 what the congestion in the Gulf of Mexico means
3 for the Strategic Petroleum Reserve, might be much
4 more amenable to a white paper. As you know,
5 maybe you don't know, the department announced a
6 test sale from the Strategic Petroleum Reserve
7 this morning. That's another thing I've been
8 working on. And that is to test some of the
9 congestion issues and changes that we are seeing
10 in the infrastructure in the Gulf of Mexico, and
11 to see how well the SPR can handle those changes.
12 And that's something that I think might be a
13 better white paper. It's a range of products.
14 We've got a lot of work to do, but I think it's
15 really exciting and interesting, and we love your
16 input, so thank you.

17 MR. COWART: All right, thank you very
18 much. Are there questions? All right, Carl.

19 MS. KENDERDINE: Your card is up, right?
20 I'm sorry.

21 MR. ZICHELLA: Yes, yes it is, and I'm
22 very, very good looking.

1 MS. KENDERDINE: From here I can see the
2 red light.

3 MR. ZICHELLA: Thank you, Melanie. I
4 have two questions. One has to do with the time
5 frame of the scenarios. The slide didn't seem to
6 mention that. How far out are we looking? What
7 is the range when we're doing this?

8 MS. KENDERDINE: Well, that's what we
9 are in discussion on right now. And you saw our
10 desirable characteristics, have a 2030 time frame.
11 We are looking at CO2 and missions reductions at
12 40 percent in a 2040 time frame -- I mean 2030
13 timeframe, and I don't know that that's going to
14 be the time frame for everything that we do, but
15 for the high level, kind of framing scenarios,
16 that's certainly going to be our time frame. And
17 I'll tell you the reason why I picked the 2030 is
18 because I was with Adam Sieminski. I'm sure some
19 of you know Adam. He runs the EIA, and I walked
20 into his office, right when I got my office set up
21 to ask him something, and he had paper copies of
22 his slides out on his table. He was giving a

1 presentation. I said, "Adam, don't you know
2 there's slide sorter on PowerPoint?" But he likes
3 to look at them on his table, which is good for me
4 because in 2030 -- I asked him about two slides,
5 Chinese carbon emissions drop off in 2030, enough
6 for me to notice it, walking into someone else's
7 office, and their iron production drops off
8 precipitously in 2030. And I asked Adam, I said,
9 "What's that about?" And he said they built out
10 their infrastructure. You know, they're friendly
11 competitors, and we want to go head-to-head and
12 compete with them in a global service economy.
13 They're transitioning to a service economy by
14 2030, and we need to modernize or transform our
15 energy infrastructures. That's kind of the time
16 frame I'm looking at, that we need to make some
17 very decisions, investments, legal and regulatory
18 changes, in order to do it in that time frame.

19 MR. ZICHELLA: That's very good. I just
20 wanted to point out that DOE has funded some
21 long-term scenario planning at the Western
22 Electricity Coordinating Council.

1 MS. KENDERDINE: Right.

2 MR. ZICHELLA: Similar time frames.

3 MS. KENDERDINE: Right.

4 MR. ZICHELLA: So it may be very
5 instructive to look at what people are thinking
6 the grid might look like under different
7 scenarios, and to see if those futures match up at
8 all with the ones you all are constructing. So,
9 I'm involved with that, I thought I would mention
10 it.

11 MS. WAYLAND: And Carl, we have already
12 met with all the interconnected studies. That is,
13 again, an example of wanting to make sure that we
14 know all of the work was being done, so we don't
15 (inaudible) at the wheel. We don't want to
16 reinvent the wheel, and I should have said in my
17 talk -- I think that in spite of all the different
18 pieces that we're going to look at et cetera, et
19 cetera, we're going to have two big work streams.
20 One of them is the grid. And then the secretary
21 very much wants us to, and announced at a public
22 meeting that we didn't know about -- I mean we

1 were at the public meeting, we didn't know he was
2 going to announce this, that we were going to be
3 doing regional fuel resiliency studies. Because
4 we've seen a lot of regional problems with fuel
5 resiliency, and that captures -- if you do the
6 grid -- I just killed the computer. If you do the
7 grid and fuel resiliency, you capture basically
8 all of the sectors that we're looking at, so
9 that's why in my head I see two very large work
10 streams, and we need data, and we don't want to
11 reinvent the wheel.

12 MR. ZICHELLA: My second question had to
13 do with the nuclear power issue about new
14 reactors. And I know modular reactors are largely
15 viewed as being potentially somewhat cheaper and
16 all of that. I wanted to make sure that, as we're
17 looking at that, we're considering decommissioning
18 costs as well. Because we look at some of the
19 small reactors in the first generation that are
20 being decommissioned, take Humboldt Bay, for
21 example, in California. The estimate for
22 decommissioning is 63 megawatt reactors, over a

1 billion dollars. California set aside 4 billion
2 dollars to decommission all their nuclear
3 reactors. So this is a potential to really skew
4 the equation somewhat. If we don't look at those
5 life cycle costs up front, and we only look at,
6 say streamlining the fabrication, that's assuming
7 we have a supply chain for these things, then I
8 think we're really going to make a big mistake
9 here. So we have to incorporate decommissioning
10 costs. They're much greater than previously
11 anticipated, 63 megawatts, 1.08 billion dollars.

12 MS. KENDERDINE: Well that will
13 presumably go into costs of the technologies,
14 okay, that we would have in the various scenarios,
15 and would vary in the various scenarios as well.
16 And so we'll be working -- it was the thing I
17 forgot to do, was to look at my intra DOE
18 strategy, and we'll be working with all the
19 programs on that, so we'll certainly be working
20 with NH.

21 MR. ZICHELLA: It's just often
22 overlooked in the cost forecasting for those

1 reactors, and I don't want to miss that.

2 MS. KENDERDINE: I hadn't thought of it
3 actually, so thank you. It's kind of horrifying
4 actually. Thank you for giving me one more
5 horrifying thing today. Other questions?

6 MR. COWART: I let the committee members
7 know that I --

8 MS. KENDERDINE: Oh, I'm sorry. I'm
9 sorry.

10 MR. COWART: I try to keep track of when
11 people put their cards up. I try to take you in
12 order. And I think Bob was next and then Paul.

13 MR. CURRY: As part of my varied
14 background, I represented a Navy contractor
15 shipyard for about 25 years. And for some
16 coincidental reason was talking to them recently
17 about the current state of the grid, and the
18 problems that were brought to mind by a former
19 chairman of FERC recently, that we all knew about
20 when they were happening. And the question that
21 they raised was about the supply chain, and about
22 the tremendously important ingredient in that

1 supply chain, the role that the transformers play.

2 MS. KENDERDINE: Right.

3 MR. CURRY: And I just wanted to
4 clarify, I think you said that that was something
5 that you were not going to look at for a couple or
6 three years. And yet the long lead time required
7 to produce these devices, which of course, aren't
8 standardized because who would standardize unless
9 they had to, was more on the order of six or seven
10 years. Is there a reason why you're pushing it
11 back? It would seem to me and seem to them,
12 frankly, that it would be useful to start now.

13 MS. KENDERDINE: And the incident that
14 you're talking about is what made me start
15 thinking about supply chains. And clearly there
16 are discrete issues that we're going to have to
17 deal with here on infrastructure. Do we have
18 sufficient drilling rigs, for example? There's
19 that kind of thing. We do, but, you know, there
20 are some very obvious supply chain concerns that
21 we need to think about. But that is not going to
22 be the focus of this analysis. Some of that could

1 inform the analysis. And again, supply chains in
2 year three -- I think doing a deep dive into
3 supply chains for all of the infrastructures we're
4 looking at here, would be very enlightening about
5 what we, you know, trade policy, investment
6 policy, et cetera, et cetera.

7 MR. CENTOLELLA: Melanie, I want to ask
8 about the relationship between the Quadrennial
9 Energy Review and something that David mentioned,
10 I think maybe before you came in the room, which
11 is the Quadrennial Technology Review. You know,
12 clearly if you're focusing on climate and the
13 ambitious goals for 2030, let alone 2050, let
14 along thinking about how does the rest of the
15 world reach similar levels of carbon reduction,
16 one needs to think about the role of advanced
17 technology in playing a significant role. So I'm
18 curious about the relationship between the QER and
19 the QTR. I'm curious also about how you see the
20 QER addressing, if at all, the department's role
21 in strengthening the energy innovation system to
22 help reduce the technologies that would ultimately

1 enable you to meet the carbon objectives that you
2 discussed.

3 MS. KENDERDINE: I have to make the
4 answer quick because the deputy secretary is going
5 to the White House on an important issue, and he
6 needs to call me, and now it's a
7 minute-and-a-half, okay, I have to call him. But
8 Karen can answer a lot of these questions as well.
9 We tag teamed around the city. The QTR is an
10 internal DOE document. We are keenly aware of it,
11 and we are talking with the people working on the
12 QTR routinely. One of the things I would like to
13 look at in our analyses are disruptive
14 technologies, almost black swans, and I would say
15 utility scale storage is one of them. That if we
16 can develop affordable utility scale storage, and
17 deploy it widely, it will change what we're
18 working on here. And so a member of my staff,
19 Henry Kelly, he's our chief scientist in EPSA,
20 he's our liaison on the Quadrennial Technology
21 Review, and we're in very close contact with them.
22 What they're doing affects other things like

1 111(d) (2). Technologies to implement, to lower
2 the cost of implementing rules, for example, I
3 think would be, from my perspective, something
4 very important that we should be looking at. So,
5 I'm going to step out for just a minute -- I know
6 this is weird, but it's a tough time. Karen, you
7 want to -- thank you, excuse me just a moment.

8 MS. WAYLAND: Don't ask another question
9 until she leaves.

10 MR. COWART: All right, continuation of
11 questions.

12 MS. WAYLAND: She hasn't heard me answer
13 the questions.

14 MS. ROSS: Melanie mentioned the scope
15 of the -- at least the first report of the QER.
16 Karen, do you envision that that will be shared
17 either through the website or will pieces of it
18 come out, as say memos and topics in conjunction
19 with the various meetings?

20 MS. WAYLAND: Yes, we do anticipate in
21 our own products, and so you'll start to see.
22 We've already been working on white papers and

1 things like that. And we're trying to figure out
2 which of those are sort of informing our internal
3 analyses, and which of those will actually go
4 through the concurrence process at DOE to become
5 public. And some of them probably will have to --
6 if they touch on other agency equities, have to go
7 through -- but we do intend for pieces of it to
8 come out before the final product comes out. In
9 part because the budget that the secretary gets to
10 influence the most, you know, in his tenure, is
11 FY16, and we certainly hope that parts of the QER
12 and the recommendations can be implemented through
13 some of the budgetary requests that agencies make.
14 So we need to get some of the work done and ready,
15 even if it isn't ready to become public yet, to
16 help inform that budget process. And then in
17 terms of the meetings I mentioned, we'll be
18 putting together memos that sort of lay out the
19 baseline case, and then ask questions. So they
20 won't necessarily -- for the stakeholder meetings
21 they will not necessarily reflect the ongoing
22 analysis that's done. But that's why we're on a

1 very tight time table for these stakeholder
2 meetings because we don't want to have them as the
3 analysis is wrapping up. We want the stakeholder
4 meetings to inform the analysis, so we're hoping
5 to get these meetings done -- I had said July,
6 before I just got permission to do the first six
7 on Friday, so my schedule may slip there a little
8 bit, but our intent is that the briefings that
9 come out about the meetings are not necessarily
10 going to give you much of a window into the
11 analysis. But I think the interim stakeholder
12 piece is going to be very interesting because that
13 will be a non for attribution sort of summary of
14 the kinds of things that we're hearing from the
15 broad range of stakeholders that we're actively
16 soliciting and that have sort of shown up as being
17 interested.

18 MS. ROSS: But the scope itself isn't
19 something that will be necessarily shared.

20 MS. WAYLAND: I hope so. Do you mean
21 like a scoping document?

22 MS. ROSS: Yeah.

1 MS. WAYLAND: I hope that we can -- if
2 we can't get permission to do the large scoping
3 document, we'll put out like a couple page fact
4 sheet. So then the answer is yes to that.

5 MR. COWART: Merwin.

6 MR. BROWN: Maybe I didn't catch it, but
7 since you're talking to this committee, and you
8 just mentioned stakeholders, are you considering
9 this committee as a stakeholder, or are you just
10 considering a collection of individual
11 stakeholders that might participate. Does that
12 make sense?

13 MS. WAYLAND: Yes, and the answer is yes
14 to both. I think that the beauty of having a FACA
15 committee is that you actually -- we can pose
16 questions to you, and you can work together across
17 your experience, to come up with consensus
18 recommendations to us. Whereas, when we have
19 these stakeholder meetings, we have to be very
20 careful how we stage the needs that we're having
21 because they're not going to be FACA meetings, and
22 we can't ask for a consensus. So I think you have

1 a huge value, in the fact that you are a group
2 with a very diverse set of experiences, that could
3 potentially, you know, answer some of the
4 questions that we pose in an interesting way.

5 MR. BROWN: So is there a procedure
6 thought out yet, or is that still in the works.

7 MS. KENDERDINE: I think as a FACA
8 committee, you have to provide advice to someone
9 else, not us. We have a, I think, isn't that how
10 it works? Can you provide advice to -- I think
11 it's to the office that you -- yes, it's to the
12 office. So you have to -- that's Pat. Oh, I
13 didn't recognize her. Hi, Pat. Yes, you have to
14 provide advice to us via Pat, I think is how it
15 would work.

16 MS. WAYLAND: I would say that other
17 advisory boards are going to do that. They're
18 going to sort of look at the issues, the scope,
19 and then provide some input through their office
20 to us.

21 MS. COWART: Following up on that point,
22 I can report that the committee leadership met

1 over lunch today, discussing just this point. And
2 we do want you to know, that we are available to
3 provide that coordinated response, and in
4 particular, we discussed how useful it would be,
5 if we worked with you in advance on the timing of
6 that, so that we could be given an opportunity to
7 answer specific questions, or to comment on
8 specific parts of the draft, in a really
9 coordinated way. So this is just something I'm
10 letting the entire committee know, that the
11 leadership was ready to propose to you.

12 I'm going to follow that with a question
13 about one of your slides, and a couple of your
14 points, which is, can you say a few words about
15 how policy neutral or not policy neutral you
16 expect the output of this process to be? For
17 example, are all of your scenarios bounded by the
18 goal of 40 percent carbon reduction by 2030, or
19 when you get down to it, does the policy analysis
20 and engagement part of the process, will that
21 yield recommendations, or just a suite of --
22 perhaps a very long suite, of policy options. How

1 do you see it going?

2 MS. KENDERDINE: We will do a long-term
3 scenario that assumes a 40 percent reduction in
4 CO2 by 2030. That will guide us somewhat, but as
5 I said, a lot of these issues have nothing to do
6 with climate. There are competing national goals,
7 security economic competitiveness and environment,
8 and we -- Karen and I and others, went over and
9 met with the Defense Department on the QER
10 yesterday. Their drivers are very, very
11 different. They have a mission, and they are
12 going to meet it, and so the balance of the
13 various goals is very different for them, and I
14 think it will be for other agencies as well, and
15 for states, and for regions. But one thing the
16 secretary is very interested in -- doing regional
17 analyses because meeting climate goals is going to
18 be very, very different for different regions.
19 But we will be doing a lot of analysis that is not
20 related to climate. The congestion in the Gulf of
21 Mexico has nothing to do with climate. A
22 long-term solution to that, might have something

1 to do with climate, and we need to make sure that
2 what we are recommending -- we will make policy
3 recommendations. It says policy, legislation,
4 regulatory, et cetera, et cetera in PCAST, and I
5 think that's in the PM as well. And so we're not
6 going to shy away from that, but we are absolutely
7 committed to making those recommendations be
8 analytically based.

9 MR. COWART: Tom.

10 MR. SLOAN: Thank you. Following up on
11 the previous question and your response, as you're
12 looking forward to making your policy
13 recommendations, and we'll just take the Gulf
14 Coast congestion and such. Will you be focusing
15 on what federal agencies can and should be doing,
16 or will you also be pointing out opportunities
17 where they should be partnering or where states
18 will have priority?

19 MS. KENDERDINE: That's a huge part of
20 Karen's job. Her title is deputy director for
21 state, local and tribes, or something like that.

22 MS. WAYLANS: (off mic)

1 MS. KENDERDINE: Thank you. I should
2 tell you how the EPSA office itself is organized,
3 and that will answer a little bit of your
4 question. We will take into consideration the
5 agency and the states. That's why we're doing a
6 state and local, statutory and regulatory
7 baseline. The decisions and what states are
8 required to do are very different from each other,
9 and so we certainly will be taking all of that
10 into account. Our office, we have a deputy
11 director for climate environment and efficiency.
12 We have a deputy director for energy security. We
13 have a deputy director for finance incentives and
14 budget, so the private sector is clearly, hugely
15 important in this. They're the one's that will be
16 making the most of the capital investments that
17 we're talking about. It's not the federal
18 government who does that or even states. And then
19 Karen is state, local, and tribal. And then Bill
20 Hederman, I think probably a lot of you know.
21 Bill is looking at systems integration, so a lot
22 of -- he's the deputy director for that. A lot of

1 the modeling work and systems analysis will be
2 done in his shop. And then we have Carl Pechman,
3 who is managing our secretariat. So the
4 organizational structure that you see there is
5 where we will put a lot of analytical focus in the
6 development of the products.

7 MR. COWART: Sonny.

8 MR. POPOWSKY: Thank you. Just again,
9 to follow up on sort of the policy issues raised
10 by Rich, I assume there's something like natural
11 gas exports. Do you have sort of a goal and
12 assumption as to whether this is going to be --
13 before you decide what infrastructure to build for
14 natural gas, it's important to know, what is our
15 policy?

16 MS. KENDERDINE: The policy right now is
17 dictated by what the law says. And the law says
18 that natural gas exports are presumed to be in the
19 public interest, unless it is determined they are
20 not. So the presumption is that they are in the
21 public interest. And that's in the natural gas
22 act, and we are proceeding on a case by case basis

1 on making conditional approvals. For those they
2 have to go through NEPA, and then DOE will make a
3 final determination. And we've done that for one.
4 I think we have given conditional approvals to
5 five others. But the law also says that that
6 process -- there is a distinction between FTA
7 countries and non FTA countries. The queue that
8 we have, where we are considering the application
9 for LNG Exports is for non FTA countries. They're
10 automatic for FTA -- not automatic, they do have
11 to come to us, but it's a perfunctory decision,
12 and we are not allowed to change anything in them.
13 And so LNG exports are dictated by law, and so,
14 you know, depending on our analysis, we will be
15 looking at LNG export terminals as part of the
16 infrastructure. There may or may not be
17 recommendations on changing the law, but right now
18 the base line is the law.

19 MR. COWART: Any other questions or
20 comments? All right very much. We really
21 appreciate it.

22 MR. KENDERDINE: Thank you, thank you so

1 much. Thank you. Thanks for having us. Hope to
2 hear from you. I think we will be talking about
3 how to coordinate our input. Thanks very much.
4 We're at our appointed time for a break before the
5 next panel. We're a little past the time,
6 actually. We'll take a 15-minute break at this
7 point.

8 (Recess)

9 MR. COWART: Merwin, it's all yours.

10 MS. REDER: (Inaudible) A panel on
11 distributive resource integration, so we have
12 three panelists today, which he will introduce. I
13 just want to mention that this effort is going to
14 dovetail into a distributed energy paper, that is
15 in flight through the course of this year. So
16 we'll be listening intently, and asking questions
17 to give us input for that piece of work. So,
18 Merwin, go ahead.

19 MR. BROWN: Thank you, Wanda. Yes, we
20 have three panelists today. Originally, we had
21 four scheduled. As you saw on your agenda, one of
22 them at the last moment couldn't make it, a person

1 from Solar City. So we have three panelists left.
2 We had a discussion earlier this morning that was
3 quite lively, so I think we're all warmed up.
4 There's some good stuff here. The process will be
5 -- given the time that we have left on the
6 schedule, we're going to try to approximately stay
7 on schedule since we've lost a person. There's
8 roughly 20 minutes per each speaker, and I'm going
9 to leave it up to each one of them to decide
10 whether they will take questions during their
11 presentation, and I'll try to manage the time for
12 them, or if they'd like to finish their
13 presentation, then take questions, and if we get
14 all through all the speakers, there would still be
15 time to ask them questions as a panelist. So I'm
16 asking them to keep their remarks roughly to 10 to
17 12 minutes in total, plus any of the conversations
18 you might have and discussions with the committee
19 here and the panelists. I've also asked each
20 panelist to expand on any introductions about
21 themselves that they feel would be relevant and
22 helpful to you in understanding the message they

1 have to say. And we're going to take them in the
2 order in which they show up on the agenda. The
3 first speaker then is, and I'm on the wrong side
4 here, is Clyde Loutan from the California
5 Independent System Operator. The second speaker
6 will be Dan Curran from EnerNOC, and then the
7 third will be Fred Fletcher from Burbank Water and
8 Power. If indeed, I have asked them to, in
9 anticipation of the white paper that we'll be
10 working on -- if they have any remarks on the role
11 that distributed energy storage has in their
12 purview to, and they feel up to it, to make some
13 comments along those lines. So, Clyde, I'll turn
14 the podium over to you.

15 MR. LOUTAN: Thanks Merwin. I have been
16 with California ISO for 14 years. Prior to that,
17 I worked for Pacific Gas and Electric for another
18 14 years in operations, transmission planning, and
19 high voltage protection. Today I'm very pleased
20 to be here to discuss with you some of the work
21 that the California ISO has been doing in terms of
22 implementing California's energy environmental

1 policies. One of the base policies we have is by
2 2020, 33 percent of the load serviced will be from
3 the naval resources. When Merwin asked me to talk
4 about this (inaudible) resources, I thought, you
5 know, a good segue is -- a significant portion,
6 about 33 percent, would be early distribution. In
7 order to understand what it takes to implement or
8 integrate energy resources on the system, I think
9 it is important to understand what it is the
10 transmission operators face on a day-to-day basis.
11 So with that, real quick about California ISO,
12 (inaudible) we serve approximately 80 percent of
13 the load in California. We've got roughly 61,000
14 megawatts of power plant capacity. We are a
15 summer peaking system, mainly driven by air
16 condition loads. We peaked back in 2006 at 50,270
17 megawatts. Some of the energy and policy drivers
18 we're looking at in 2020, the greenhouse gas
19 emission or CO2 emission needs to fall back to
20 1990 levels. I already mentioned 33 percent of
21 the load needs to be served by (inaudible) by
22 2020. (Inaudible) we think achieving that 33

1 percent is going to before 2020. We're looking at
2 not quite as high, but we think it could be as
3 high as 12,000 megawatts of distributed energy
4 sources on the system. Now that we have a
5 significant portion of the supply being from
6 variable energy resources, we also noticed a
7 change on the demand side, which is, you know, you
8 have (inaudible), demand response, price
9 responsive load, (inaudible) grid, et cetera, so
10 particularly what our load's going to look like on
11 any given day is a challenge for us also. Last,
12 but not least, we have roughly 12,000 megawatts of
13 steam plants that uses the sea water for cooling.
14 It goes back out more than it comes in. We may
15 lose 12,000 megawatts of steam. Now on the
16 transmission side, some of the things we noticed
17 -- even though it was five-minute dispatch, every
18 five minutes, what we noticed is the variability
19 between load, wind, and solar is so much in 5
20 minutes, 10 minutes, 15 minutes, that we see the
21 need for regulation, which is what you use to
22 balance the system on a 4-second basis, increased

1 quite a bit. It used to be around plus or minus
2 350 megawatts. Now that's closer to 6, 700
3 megawatts. We also noticed the motor capacity you
4 need to have within an operating hour. It needs
5 to be anywhere around 3,000 or 4,000 megawatts.
6 This is a capacity you need to have synchronized
7 to the grid, and be able to dispatch to meet the
8 variabilities of wind, solar, and load. Also we
9 anticipate some significant ramps, three-hour
10 ramps. So in the evenings we anticipate ramps
11 between 12, 13,000 megawatts across three hours.
12 Most of you are familiar with power plants. The
13 plants we have today, they're not as fast to
14 provide you that kind of speed in three hours.
15 What makes it a lot more challenging for
16 California ISO, is we have a lot of (inaudible).
17 It's over 10,000 megawatts. We have a diverse
18 resource mix, so when you look at things like
19 (inaudible) on those units. What we also need to
20 worry about is in 2016, (inaudible) has this new
21 operating standard, which places a frequency
22 response obligation on each balancing authority.

1 What that does -- it would require some entities
2 to operate differently. We need to have
3 (inaudible) on units, so that you can meet this
4 obligation within less than a minute (inaudible).
5 And prior to determining (inaudible) resources, is
6 still something that industry is trying to
7 understand. Typically, during non-summer months
8 this is how the load looks for the California ISO.
9 We see a 6,000 megawatt increase, right around
10 when people leave work in the evenings. When you
11 look at wind, which is on a really good day
12 between 1,000 and 2,000 megawatts, not much
13 change, but when you look at solar coming on to
14 the systems, you have a three-hour period right
15 here from about 8 to 10, where that solar just
16 ramps up. Then it just ramps down in the
17 evenings. So when the speed of the solar ramps
18 up, your increase is not as great, so it creates
19 an interesting challenge here, when you look at
20 the load minus wind, minus your solar, which is
21 what you dispatch the system to, so conventional
22 units will have to be dispatched along this red

1 curve because we treat wind and solar today, more
2 or less as a must take generation. So in
3 mornings, you're going to be looking at ramps
4 about 7,000 megawatts in three hours, and as soon
5 as those conventional units ramp up, you're going
6 to tell those guys, hey, we need to ramp down, and
7 right about this area here, when you see minimum
8 load 18,000 megawatts, it's pretty interesting. A
9 lot of interesting things happen here right now,
10 and then you're going to be looking at a
11 significant ramp, you know, from 6,000 megawatts
12 currently, to when the solar drops off, you'd see
13 and increase here of almost 12 to 13,000
14 megawatts. So why is that difficult? Well, right
15 in this area here, it's difficult to commit a lot
16 of resources because we have more than 10,000
17 megawatts of non-dispatchable resources. Now last
18 weekend, on Saturday, the load was pretty low.
19 This dropped to below 17,000. We started to see
20 negative places right around mid-day, 1 o'clock, 2
21 o'clock in this area right here. So it's real.
22 It's happening today, and it's something, you

1 know, we need to figure out what it is we need to
2 do to this red curve to (inaudible) to come on at
3 this point to flatten this red curve. So, this is
4 again, by 2020, what we anticipate. When you look
5 at the non-dispatch, low qualifying facilities,
6 you look at the gas cooling off in the nuclear
7 plants, we have geo- thermal, and then we have
8 some (inaudible) units, the entities within
9 California, you're pretty much -- these are
10 non-dispatchable (inaudible) right here, so if
11 your wind kicks up or your solar kicks up, having
12 the ability to (inaudible) resources is a
13 challenge. Now when you look at -- we need to
14 operate -- we have about (inaudible) so that's
15 going to be running. Now, if you need any amount
16 of dispatchability done, you need to operate those
17 units.

18 So this is essentially what it is going
19 to look like. And as I said, we need 3,000
20 megawatts of load forming capability, so in order
21 to have that, you need to operate at 3,000
22 megawatts those conventional units above the

1 (inaudible). So now this area right here is of
2 significant concern. We're looking at a lot of
3 things. How can you (inaudible) loads right in
4 this area here, to flatten this out, so that we
5 could reliably integrate renewables onto the
6 system. With distributed resources coming in, it's
7 going to be pretty much transparent, if that.
8 Solar plants are going to be either transmission or
9 the distribution. So the impact (inaudible) and
10 between 8 and 10 a.m. you can see that rise, and
11 then it will drop off in the evenings. So some of
12 the challenges we see on the distribution is the
13 voltage fluctuations. Also, when you have a lot of
14 PV on the system, the voltage will tend to go high,
15 and that would cause several things to happen. Now
16 the voltage control devices that you have in
17 distribution, they're going to tend to operate a
18 little more. You're going to have more wear and
19 tear, and the ability to control the megawatt,
20 today the connection rules and the distribution is
21 a lot different from the transmission. So the
22 actual rules of distribution does not allow you to

1 move those unites, so if you have PV plants, let's
2 say producing 100 megawatts, you want to back that
3 off to 80 megawatts. It's very difficult to do
4 that the way the connection rules are constructed
5 today. So the other thing we need to be aware of
6 on the distribution side -- you have single phases,
7 right? So the solar is going to be on single
8 phases, trying to maintain that balance in three
9 phases is a challenge. So back at the sub-station
10 that could look as a line to ground fault, if
11 you're not really careful what you're doing. And
12 also, when you have low loads on your distribution,
13 you attempt to have that back feed, back towards
14 the transmission, and that has an impact on the
15 protective devices you have on the system. Again,
16 the last thing is the controllability on the
17 system. Now, the distributed energy resources,
18 they also have an impact on the transmission. The
19 biggest one is the lack of visibility and
20 uncontrollability of those resources. Now, with
21 the new standard that's going to be coming out in
22 2016, if you have a large concentration of PV

1 plants, that can impact your ability to meet that
2 frequency response obligation, and again, what that
3 is (inaudible) following any disturbance of the
4 system. So you would terminate the connection,
5 like in the west. We have 14 states -- wherever
6 that disturbance is, each has to respond,
7 proportional to that frequency drop. So, having
8 the ability to maintain (inaudible) is going to be
9 a challenge. Now, the combined heat and power,
10 this is pretty interesting because it is very
11 efficient to have, you know, combined heat and
12 power plants in the distribution, but let's say,
13 trying to predict that from the transmission side,
14 if the prices go negative, it might be cheaper for
15 you to buy that energy from your transmission. If
16 your generator uses steam, or whatever it is that
17 you're doing on the distribution, so trying to
18 predict what that load is going to look like from
19 the transmission, it's really a challenge today.
20 Over the past ten years, we have one big variable
21 in the system, which would really predict what our
22 load is going to be. Now, we need to predict what

1 our load is. We need to predict what the solar is
2 going to be doing tomorrow, what the wind is going
3 to be doing tomorrow, and how do they interact the
4 next day because you commit resources 24 hours
5 ahead of time. Sometimes, you do that two days
6 ahead of time. We have some units that take two
7 days to start up. So, if you're not really careful
8 how you predict those load demands, you know, you
9 could pretty much be caught (inaudible). And then
10 the price responsive load is pretty interesting.
11 Predicting, as I said, price responsive load,
12 energy efficiency, the amount of response,
13 (inaudible) are going to be a lot different from
14 the way we are accustomed seeing the load in the
15 past. We had worked with NERC last year, and
16 identified four characteristics that we think, you
17 know, jointly that renewable resources need to have
18 somewhat a conventional use. One of those is the
19 ability to provide reactive power support. Second
20 is the automatic voltage control. The third is
21 active power management, which is the ability to
22 really control that megawatt output from your

1 renewable resources. As you are aware, Germany has
2 a lot of problems trying to control frequency and
3 voltage today. We are trying to avoid that in
4 California by trying to get some of these
5 interconnection centers implemented ahead of time.
6 We also see the need for coming up with frequency
7 controls, another characteristic we think that
8 variable energy resources needs to have.
9 Interconnection standards is really important,
10 being able to provide voltage frequency control.
11 Also protection is really important for us now and
12 load sharing when your frequency drops, can also
13 aggravate a system frequency. Two things here that
14 are coordinated in a distribution voltage device is
15 transmission, that's something we need to carefully
16 look at, and also what form of major event on the
17 system -- how do you really coordinate the
18 distribution resources and your transmission
19 resources for (inaudible). Now, these recent
20 resources could contribute to a reliable operation.
21 So many things here like energy storage, they can
22 help us mitigate some of that over generation

1 problem. Helping to shift loads, not only reduce
2 load demand during the evening periods, but also
3 how can you incentivize loads to come on during low
4 demand periods. It's also something that
5 distribution and energy resources can help us do.
6 Controlled load dropping -- with the technology we
7 have today, they can (inaudible). California has
8 them today. We would allow (inaudible). The only
9 requirement is you need to provide ten percent of
10 the spinner requirement within ten seconds. So it
11 tries to mimic a generator provides a spinner
12 reserve today. Micro grids, they can also help in
13 restoring service. (inaudible) they can provide
14 regulation service for us. We just need to figure
15 out, you know, is it more effective to have a
16 different way to distribute regulation signals,
17 than the way we do it today through centralizing GC
18 system. So that's something we're also looking at.
19 Some of the potential challenges that energy
20 resources need to overcome to help the situation
21 here is controllability, sustainability, and
22 visibility. Visibility is key because we need to

1 know what is sitting out there. So than you can
2 plan, you need reserves for that. In some cases,
3 you know, you can have a cloud cover that comes
4 over -- and take out 400 to 500 megawatts, you need
5 to be able to back that up. As I said, IEEE 1547,
6 which is the interconnection started for
7 distributed energy resources, it does not -- the
8 rules are completely different when it comes to
9 interconnected resources in the transmission, as
10 opposed to the distribution. Today, when we
11 dispatch units, we have an expectation to respond
12 within a certain time frame. The expectation also
13 is with distribution of energy resources. What
14 kind of response are we expecting to get when you
15 dispatch or you give those energy resources a
16 dispatch signal. Devices that coordinate between
17 the transmission and distribution, as I said,
18 that's key, and also coordinating your resources
19 post-contingency. Knowing what you have out there
20 is really important in trying to figure out what
21 our load forecast is. And also the market design
22 and pricing policy for these energy resources, we

1 still need to get a better understanding of what
2 that is. Now to renewable, we're looking at three
3 different partners in the west. One is general
4 resources. This is not only conventional
5 resources, but also renewable resources. But then
6 with that you need to look at energy storage. They
7 can provide ancillary services. They can help you
8 with load shifting, (inaudible) periods, and also
9 loads. These three things, you know, we think in
10 partnership will give us to ability to integrate
11 beyond 33 percent, not only by 2020, but in the
12 future. And with that, you know, I'm open to
13 questions. Do we have time?

14 MR. BROWN: Clyde, we have about five
15 minutes left of your time. If there are any
16 questions now, or we can wait until the end.
17 Which would you rather do?

18 MR. COWART: Let's wait.

19 MR. BROWN: Okay. Then hopefully, we'll
20 have time for questions at the end. Dan, you're
21 next, Dan Curran from EnerNOC.

22 MR. CURRAN: Thank you, Merwin, and

1 thank you to the committee for having me here
2 today. I am the principal of market strategy at
3 EnerNOC. What that means is, I live somewhere
4 between our regulatory and our markets team. I
5 sort of translate between those two teams because
6 they're two very different worlds, I've found. My
7 experience has been over the years, that when I've
8 been asked to give a talk on demand response, I
9 typically have to spend the first 30 to 50 percent
10 of the talk explaining what demand response is.
11 I've been assured that with the people we have in
12 the room here today, that I don't need to do that,
13 so that's a treat for me. I have spent a fair
14 amount of the past five years, managing the
15 participation of EnerNOC in the PJM capacity
16 market, both in terms of the forward capacity
17 market and the emergency load response program.
18 My understanding is that traditional capacity
19 based and priced based DR is not really what this
20 group would probably be interested in hearing
21 about today, in the context of distributing
22 resources, so I won't focus on that. I will touch

1 upon it briefly, but what I will talk about today
2 is some of the more advanced capabilities that DR
3 can currently offer and some of the things that
4 we're thinking about for the future. So I'll just
5 give a brief background on who EnerNOC is, kind of
6 where we fit in the DR industry, and where we
7 think it's going. And I'll give a few case
8 studies of some advanced capabilities of demand
9 response, and I hope you'll see some applicability
10 there, with some of the issues that you're
11 thinking about with distributed resources. And
12 then last, I'll close with a few thoughts from a
13 policy standpoint on what can be done to foster
14 the growth of DR, and in particular, how DR can be
15 used to help with a lot of the challenges that
16 we're facing.

17 EnerNOC has a pretty wide footprint with
18 respect to the main response. We operate across
19 the country, and now internationally. We operate
20 in both traditional regulated and deregulated
21 regions. This slide is unfortunately a few weeks
22 or months out of date. If I had it up-to-date,

1 there would actually be three new countries on
2 this map. In the past few months, we started to
3 participate in demand response programs and pilots
4 in Japan, and in Germany and Ireland. It's
5 probably no coincidence that in a place like
6 Germany, we're seeing that as an attractive market
7 to enter, given some of the challenges that
8 they're seeing with attributed resources. We see
9 this as a market where demand response can help.
10 I mentioned that I wouldn't talk too much about
11 capacity and price based DR, but I did want to
12 highlight, that when we think about DR, at our
13 company, we think about a broad suite of products.
14 Not all DR is created equal. Not all DR is used
15 to solve the same problem. You know, kind of what
16 most people hear about it the capacity-based DR.
17 What I'll talk about today is some of the more
18 advanced (inaudible) that we have down in
19 ancillary services. I will come back though, to
20 this description towards the end of the
21 presentation, to talk about why, even if your
22 focus and your interest with respect to demand

1 response is in ancillary services fields, it's
2 still important to think about capacity and
3 energy, and how those can help foster growth in
4 the ancillary services sector.

5 In terms of where we see the demand
6 response industry going, and certainly where we
7 see our company going, we're not viewing DR going
8 forward as simply just curtailment or simply
9 back-up generation. We're viewing the industry as
10 we're moving more towards broader, you know,
11 offering a broader tool kit for both customers and
12 utilities, to help manage their energy more
13 intelligently. And our own company, you know,
14 personally we are really transitioning to think
15 about how we can provide software and tools to
16 help end-users understand their energy, to help
17 them understand their usage and (inaudible), to
18 help them understand where they can make decisions
19 to help manage their energy more intelligently.
20 And we feel that this has allowed people that
21 ability to understand their usage, and to have
22 insight into it. It is really critical to enable

1 loads to understand what advanced capabilities
2 they might be able to offer to the grid. So when
3 we start thinking about down the road, trying to
4 have the load side of the equation be more
5 integrated into how we manage balancing issues
6 with distributed resources, we think that software
7 tools like this are going to be a big part of
8 that, a big piece of that puzzle. Part of why
9 we're starting to evolve our thinking about the
10 products that we should be offering, is that we
11 really see ourselves on this roadmap to the
12 eventual smart grid -- we're sort of somewhere in
13 the middle here right now, is kind of where I put
14 our company. Having a fully functional smart grid
15 really starts with the foundation of advanced
16 metering, something that as a company, we've been
17 able to leverage a lot of the advanced metering
18 that's been installed in certain regions by
19 utilities. Where that doesn't exist, we've simply
20 built it on our own. That's something that we've
21 found to be really a foundational bedrock of being
22 able to build a demand response network. As I

1 said, now we're really starting to thing more
2 broadly in terms of how does DR lead us to
3 providing customers with the tools to manage their
4 energy more intelligently, and we're on the path
5 to getting to a place where DR can be used for
6 things like storage and things like renewable
7 integration. I will also talk about in a moment
8 some examples of how we're seeing that happen.

9 The first example I'd like to give in
10 terms of the advanced capabilities of DR, is a
11 frequency response program up in Alberta. Now,
12 this might sound strange to hear, but Alberta in
13 some respects, really looks like an island
14 network. A lot of the problems that they have to
15 face up in Alberta, are similar to what you might
16 find in the grid, down in a place like New
17 Zealand. There is -- with Rocky Mountains on the
18 west, there is a limited capability to bring in
19 supplies from British Columbia, where there's quit
20 a bit of excess hydro. But there are a few tie
21 lines that can bring that excess power into
22 Alberta, when the Alberta system operator starts

1 to import from British Columbia, those tie lines
2 suddenly become the single largest contingency on
3 the system. And if those tie lines were to go
4 down, that could cause some massive disruptions.
5 So one of the tools that the ISO is using, is a
6 program that's called the load shed service for
7 imports or LSSI. This is a frequency response
8 program where large loads are connected to an
9 under frequency relay, that can actually read the
10 frequency of the broader grid, and there's a sub
11 second response. So we have been participating in
12 this program now for several years. We are on a
13 regular basis bidding in over a hundred megawatts
14 of frequency response DR. This can be dispatched
15 in less than a second, based on frequency
16 disruption on the grid. So this looks and feels
17 much, much different than the traditional capacity
18 based DR that many of you have probably heard
19 about. This is the type of product that we think
20 can highlight some of the advanced capabilities
21 that DR can offer going forward.

22 The second example that I'd like to

1 point to, is a pilot program that we participated
2 with a few years back with the Bonneville Power
3 Administration. This was a bi- directional load
4 following, DR program, where DR was responding to
5 changes in output from wind generation. And DR
6 was responding both up and down, which is
7 something that historically we thought would pose
8 a very big challenge. When we think about DR, we
9 think about it going down. We don't often think
10 about it going up. In the BPA territory, they've
11 had a pretty rapid growth over the past several
12 years, with respect to the wind generation. And
13 the idea behind this pilot, was to understand, can
14 DR actually provide some balancing here in both
15 directions. Now this was a small pilot program.
16 This was less than five megawatts, so it's much
17 different than the program that we talked about in
18 Alberta, which is a fully functioning program.
19 But I highlight this because this was, I think, a
20 very, very valuable pilot for both companies like
21 EnerNOC and for the BPA, in that it allowed us to
22 learn a lot about what types of customers are

1 viable for this type of service, what types of
2 flexibility they need, and what type of incentive
3 structures need to be in place. These are the
4 type of programs, I think, going forward that can
5 really be a great model for how we can start to
6 understand how DR can be further expanded to help
7 us with some of the challenges that we'll be
8 facing with some of these distributive resources,
9 as they continue to grow.

10 So I'll close on a few slides, you know,
11 just talking about some guiding principles in
12 terms of what can be done from a policy
13 perspective. First is, the most important guiding
14 principle that we see is that if you want DR to
15 help solve some of these challenges, the first
16 step is to provide access to the markets, both in
17 terms of allowing DR to participate and making
18 sure that the incentive structures are in place,
19 so that it's comparable with generation, and that
20 it's actually providing the right incentives for
21 load, to be able to modify their usage on a
22 consistent and reliable basis.

1 Next is this concept of building a DR
2 base. So I talked about that I didn't want to
3 dwell on capacity based DR, but I did want to come
4 back to it to show that, even if what you're
5 concerned about is ancillary services, in terms of
6 what you're looking to get out of demand response,
7 it's important to understand that one of the
8 quickest ways to essentially get a catalyst to
9 build those advanced capabilities, is to start
10 with the types of capacity and price-based
11 programs that we see in a lot of the deregulated
12 markets across the country. That really allows
13 both customers and DR providers and utilities and
14 regulators to, you know, start to dip their toe in
15 the water to start to build the experience, to
16 start to work out all the mechanics that are
17 needed to build these complex ancillary services
18 programs that will be needed down the road.

19 And just lastly, I'll close by saying
20 that there will be a lot of challenges with
21 respect to fully integrating DR with distributive
22 resources, but there will be quite a bit of

1 opportunity there too. We see that what we've
2 done thus far with the response is really just a
3 start of what we'll be doing five or ten years
4 from now, and we don't believe that in five or ten
5 years from now, we'll be thinking of DR as just
6 curtailment or a diesel backup generator. We'll
7 start to be thinking of DR as really a network of
8 remotely managed resources, and whether that's
9 curtailment or DG like solar or storage, these
10 different types of resources will be combined
11 together into a portfolio that can be used to
12 manage all different types of challenges. So we
13 think that we've really just started to scratch
14 the surface in terms of what DR can do going
15 forward. So that's it for my comments, and I
16 guess we'll wait for the end for questions.

17 MR. BROWN: You've got about seven
18 minutes.

19 MR. CURRAN: Okay, so I will open it up
20 now if there are questions.

21 MR. BROWN: The next speaker is Fred
22 Fletcher, Burbank Water and Power.

1 MR. FLETCHER: Hello, I'm Fred Fletcher
2 from Burbank Water and Power. I started in the
3 industry 40 years ago. I was an electrical
4 engineer at the time. I grew up in South Dakota,
5 and started working in the crises that we were
6 facing back in that era. I also helped form
7 Missouri River Energy Services in Sioux Falls in
8 1977, and then went out to Burbank to be assistant
9 general manager in '86. So I've been out at
10 Burbank since 1986. Burbank is embedded in Los
11 Angeles. There are a lot of municipals out there
12 in Southern California. There's not only Los
13 Angeles, but there's Burbank, Glendale, Pasadena,
14 Anaheim, and Riverside, Azusa, Banning, and Colton
15 in Imperial Irrigation District. Together,
16 they're about 10,000 megawatts. We work under the
17 Southern California Public Power Authority.
18 That's how we do a lot of our stuff together, and
19 it's interesting. We've done a lot of interesting
20 things out there. Now Burbank, I think, is an
21 interesting utility because we're very much like
22 the rest of the country. We're vertically

1 integrated, our electric mix is very similar to
2 the rest of the country. We're about ten percent
3 hydro, about ten percent nuclear, we're 30, 40
4 percent coal, and we're 30 percent natural gas,
5 and we're about 25 percent renewable right now.
6 That's the part where we're a little different.
7 But we're seeing a lot of the same problems that
8 Clyde talked about, in how solar is coming in.
9 The big one we've got on solar, is we're going to
10 have Copper Mountain come on line out of the
11 Hoover area, out of Las Vegas in 2016, and that
12 will be 40 megawatts. On a nice day in April, our
13 load is only 130, 140 megawatts. So having a 40
14 megawatt resource is going to take some appetite
15 to take it in. We are challenged with a lot of
16 points here. I want to thank the DOE for helping
17 us get the grant. We got a grant from the DOE,
18 and that grant has been instrumental in having us
19 set up our system, so that we can be prepared for
20 this. What we've done on our smart grid grant
21 here, is that first of all, we have a network that
22 blankets the entire City of Burbank, 18 square

1 miles, 100,000 people, where three quarters of our
2 load is commercial, and 25 percent is residential.
3 Most of our commercial load is media industry, but
4 we've put this system out so that we'll have a
5 very low latency. The latency on the network is
6 around 200 milliseconds, and it has to be that
7 fast because the number -- if you don't follow
8 your stuff close enough, you've only got about 200
9 milliseconds to keep your power plants online, if
10 you start getting out of balance. We found out
11 one of the big things though, when you put these
12 systems in, is just how complicated all of the
13 digital technology is. It is really an enormous
14 job to keep track of the networks, the
15 interconnection of the networks, how they can fail
16 and restore themselves with these spanning trees,
17 and then the data. All of the data has to be
18 rectified and made accurate. You cannot live with
19 inaccuracies on your data. So we've managed to
20 put this stuff together. It's been a challenge,
21 but we've got our AMI put in. We've got a new
22 state of the art billing system. It went live two

1 weeks ago, trouble free. It's supported with a
2 meter data management system. Now we're getting
3 into the outage management system to make sure
4 that's going to work all right. So it's a real
5 challenge getting all these pieces put together.
6 But one of the key things that we put in the
7 system, that I wanted to talk about is our
8 integrated, automated dispatch system. Now what
9 the integrated, automated dispatch system is, it's
10 kind of like the Scada system. It's kind of like
11 a power management system, and a scheduling
12 system, all mixed together. Now, even though I've
13 been the assistant general manager at Burbank
14 since 1986, in power supply, I actually retired
15 from Burbank in January of 2010, to go to work for
16 Open Access Technology International as their
17 smart-grid architect. What I did there, was I
18 developed the foundation for this system. And
19 then as luck or life happens, in June of 2010, I
20 started getting detached retinas. And when you
21 get detached retinas you can't fly, and I was
22 stuck at home. That wasn't a lot of fun. Burbank

1 said they weren't able to replace me, so they
2 talked me into coming back. And so I came back,
3 but then I came back with also all this knowledge
4 of how this stuff works behind the scenes. So I
5 was able to take it to the next level and figure
6 out how to do this. Now basically, what this does
7 is it looks forward in time, a couple weeks, and
8 it figures out, what is your economic dispatch on
9 all your resources, based on what you see your log
10 doing? Then you move up to your scheduling day,
11 and you set your schedule up, and it does your
12 optimization into that point. Then you go into
13 the current day, it then analyzes in the morning
14 for the afternoon, and then the afternoon for the
15 next morning. Then you get to four hours before
16 the scheduling hour, it then does the final steps
17 to change your schedules. And then when you go
18 into the current hour, it then takes advantage of
19 the emerging energy and balance markets. So this
20 is kind of a convergence of the forecast, so that
21 you can make sure that things work. And it takes
22 into consideration, all of your resources,

1 including the distributed ones. And those
2 distributed ones then are tied in through our
3 meter data management system, so that they can
4 then get into the appropriate billing engines on
5 the oracle billing cycle. So, what happens with
6 that system, is it breaks up into three areas.
7 Basically, energy, which is the ability to match
8 energy alone. The next one is regulating because
9 you need to have enough capacity, if you think
10 your load is going to go up, so that you've got
11 enough capacity to go up, or if you think your
12 loads are going to go down, you have enough
13 capacity that can regulate down, to be able to get
14 there. Now our basic regulating unit is Hoover.
15 So we've got 20 megawatts of Hoover that we can
16 use to adjust. Then we have the spin and
17 non-spin. Even though we're in Los Angeles in our
18 water and power balancing area, L.A. treats us as
19 a separate balancing area within their area.
20 Because of the increased amount of work going
21 toward balancing generation load, we're making our
22 relationship as a balancing area with Los Angeles

1 much more formal. So we're setting up parallel
2 balancing criteria for Burbank and Glendale for
3 L.A., much like NERC and WCC have done for L.A.
4 Now what's different about L.A., Burbank, and
5 Glendale, is that we're not part of the California
6 ISO. We're separate, and so we have more of a
7 situation like the rest of you do in the country,
8 is trying to balance this and keep your low
9 balance to yourself. But this system does help do
10 that, and it does help to make sure that we're
11 compliant with the critical performance standards
12 and the balancing areas ace limit. Also, the
13 automated dispatch system can keep track of what
14 the distribution system is doing now, and whether
15 the phases are staying in balance. So this was
16 put together as a joint thing of Open Access
17 Technology International, Schneider Electric,
18 which is actually Telvent out of Houston and
19 Denver, and then IP Keys, who put together the
20 telecommunications network and the ADR 2.0 system
21 that we have to help coordinate our demand
22 response. The big thing we're seeing right now is

1 big changes are on the path for how we're going to
2 change, how we relate to our customers. And I
3 can't give you any magic formula for how to do
4 that because we don't know how it's going to
5 change. It seems like every quarter there's a new
6 study that's valid in how the changes are coming.
7 But the one thing we do know, flexibility is going
8 to be needed. And I think that flexibility needs
9 storage. I think storage is going to be really
10 important, demand response, quick demand response
11 is important, and maybe evolving into some new
12 markets. You know, it might be that electricity
13 could play a larger role in heating and air
14 conditioning than it does now. The security site
15 is another thing that's important. What we've
16 done from the beginning, is we put lots of
17 security into our system. We followed the best
18 practices, plus we've also worked with some other
19 federal agencies to make sure that we're using
20 some of the best -- we been using the test bed for
21 some of that. We are strong supporters in
22 regional or inter- regional coordination. Burbank

1 not only operates power plants for itself, but it
2 also operates power plants for other municipals in
3 Southern California. We've got a hydro up in
4 Washington, and we've got our power plant
5 Magnolia, that operates for six municipals in
6 Southern California. And each of those things
7 allow us to trade. We do a lot of trading on the
8 market to balance things out. Altogether, those
9 things help reduce our dependence on any one
10 resource and allow us to start understanding what
11 we can do to take advantage of all the resources
12 that are available across the western
13 interconnection.

14 The other business planning thing that I
15 think is going to have a lot of potential, is what
16 we can do with rates. By changing our rate
17 structure, and looking at different ways to do our
18 rates, we can make the demand response work
19 better. I don't look at demand response as load
20 shifting anymore. I look at it as a means to
21 automate for the customer, the most favorable
22 steps for them to take, to take advantage of our

1 rate structure. So that the customer doesn't have
2 to do their own things themselves, they can
3 subscribe for the services through the utility,
4 that will optimize their power bill with managed
5 response, and be able to show the customer how
6 much they saved by doing that.

7 Now, the next thing we're doing now, is
8 what about going beyond 33 percent renewable.
9 Right now, Burbank is going to be at 33 percent
10 when Copper Mountain comes on line in 2016. But
11 that's just part of the road to get to our overall
12 climate reduction that we've set for 2050. In
13 2007, we set the goal at 33 percent. We're not
14 doing an integrated resource plan where we're
15 going out to the public and asking them what we're
16 going to do. What's going to be beyond 2020?
17 What are we going to get done by 2030? We're
18 looking at compressed air energy storage of a
19 large size as a potential means. Working with
20 Duke Energy and American Transmission Company,
21 Burbank Water and Power submitted to the Western
22 Electric Coordinating Council a proposed study to

1 take 4,000 megawatts of Pathfinder Wind,
2 Southeastern Wyoming, couple that with the Zephyr
3 DC Line, interconnect w that in Delta, Utah with
4 our Intermountain project that's at Delta, Utah,
5 and then build a compressed air energy 1200
6 megawatt plant there to tame that wind, so that a
7 steady stream of renewable energy can go down that
8 DC line from Delta, Utah, into Southern
9 California. So that study got approved this week
10 for this next year by WECC. So we're really
11 interested in seeing how that study can work out.
12 Doing these studies is so important right now, so
13 that we know, are these things practical, what
14 will they deliver, so we can actually -- I've got
15 kind of an ambitious goal. My goal has been, how
16 about we go to two thirds renewable energy by
17 2030, at rate increases less than the rate of
18 inflation. That's a challenge, but when you kind
19 of look at it, it may be possible to do it. If
20 you can take advantage of the interregional
21 efforts that we've got here to get cheap wind,
22 ways to tame that wind, and then deploy in the

1 local space, storage, DR, and new markets. Using
2 local energy storage with DR, DER, solar, and
3 Urban Generation to meet these load requirements,
4 might be able to meet that goal. A little over a
5 year ago, this Bob Schulte, he did a study for us
6 to see whether this might be possible. We looked
7 at doing this and basically it was a quality
8 study. It wasn't a quantitative study, but it
9 showed that we could replace our coal fire
10 generation with this case and Pathfinder Wind, at
11 about a 15 percent increased crossover call. And
12 so that's close to being able to meet that
13 objective. The local storage is an important
14 thing because if we've got this high capacity
15 renewable stream coming in, sometimes it's going
16 to exceed the load, so we have to store locally.
17 And then other times the load's going to be higher
18 than that, so you unload the local storage. Then
19 the solar comes on. So now you've got to absorb
20 the excess solar, but you need to do that just in
21 time as the peak comes up. So it's possible to
22 make this work, so that we can make local storage

1 work and keep our rates down. Again, the
2 integrated ADS has in it, the capability to help
3 do this optimization. So have these tools and
4 this network, so that we can do this, plus the
5 data structure and the interlocking nets is very
6 important.

7 The next thing is, beyond what we've
8 just been talking about here, the other big thing
9 is what we call Project Blackstart. This came out
10 from Sandy, and that was that we recognized that
11 in the event that we lose all of our grid, we're
12 going to need to restore quickly. When we did an
13 analysis of that, we found our grid wouldn't
14 restore. If we were to have an earthquake, it
15 would probably be impossible to get the unit back.
16 Basically, here's what happens -- the grid goes
17 out. The local plant goes out of balance with
18 generation. The frequency moves off 60, the plant
19 trips. It then starts to heat up, and within a
20 few minutes, it starts to blow steam. As you lose
21 those water molecules, you can't restart until you
22 put more water back in the boiler. In order to

1 put water back in the boiler, you've got to let it
2 cool down for two days. Two days, following an
3 earthquake, is no fun at all. So what we want to
4 do instead, is we want to be able to catch this
5 and bring the plant back that power. So the next
6 time we have an earthquake, we're able to put the
7 lights back on within the hour. It's also showed
8 us how we can manage microgrids. If we start
9 looking at this as a microgrid problem, we can
10 start seeing how the microgrids can tie together,
11 so we can structurally put the thing back
12 together. The main thing is, is that we might not
13 be able to protect against everything, but if we
14 do have things when it goes apart, restoration is
15 a very important strategy for any kind of problem
16 like that. Okay, so I'll take questions later, as
17 well.

18 MR. BROWN: Thank you, Fred. (Audio
19 interruption) ten minutes, and I don't know how
20 much we want to (inaudible) on that, but let's
21 start. Any questions? Yes, Clair.

22 MR. MOELLER: Thank you. I'd like to

1 challenge an assumption that I heard both Clyde
2 and Fred make. And that has to do with the
3 assumption that you must have storage to make
4 (inaudible) work. The ability to control
5 (inaudible) is there. You simply have to do it.
6 We've experienced in the wholesale market where we
7 essentially put all wind machines inside the
8 dispatch (inaudible). We dispatch them down when
9 it's too much, and then we take them back up to
10 their capability when they can. The other thing
11 that I'd like to talk about is, there seems to be
12 an implicit assumption around feed-in-tariffs,
13 which are probably the worst tool there is, in
14 terms of actually controlling the system. We also
15 discovered that when you send someone a bill for
16 the privilege of oversupplying generation, they
17 quit, really fast. So think about your political
18 systems, and make sure they're matching the
19 marginal cost of energy because if they don't,
20 you're going to get really silly outcomes. And
21 I'd suggest as you deal with data problems, and
22 all those things are true, and they have to be

1 solved, but let's not have a bad policy assumption
2 cause crazy economics. Let's make good policy
3 assumptions so that it matches the economics as we
4 work our way through these kinds of questions.

5 MR. FLETCHER: I've considered those
6 issues a lot. First of all, I agree that
7 feed-in-tariffs are a tough one to make work and
8 make sense, but storage does make sense, and it
9 depends on what form the storage is. And I also
10 like to be able to control the things as well, and
11 make the match between them because it is an
12 optimization thing. It isn't a silver bullet,
13 that one technology is going to take care of
14 everything. It depends a lot on how you structure
15 and what your objectives are. I don't have any
16 problem with following policies with technology,
17 provided you can do that cost effectively.

18 MR. LOUTAN: So just to add on that,
19 each system is a bit different. Now when you look
20 at the California ISO's footprint, as I mentioned
21 we have a lot of non- dispatchable generation. A
22 big question that comes to us (inaudible). So now

1 it comes down to which one you're really going to
2 back off. The IOU's, they have a 32 percent
3 target that they have to meet. So in some cases,
4 you need to have storage, not only to consume that
5 excess generation, but also to meet steep ramp on
6 evenings. Just one more thing on that. If you
7 decide to curtail, sometimes, I can agree with
8 that, but if you decide to curtail almost every
9 day, every weekend, or holidays, then it becomes
10 something that you seriously need to look at, if
11 you have an RPS target, how many times you want to
12 really curtail renewable.

13 MR. BROWN: Okay, thank you. I think
14 Billy was next, and then Mike.

15 MR. BALL: Yes, this is a question for
16 Clyde. In your graph you talked about
17 investigating ways to increase the load in that
18 particular example in the middle of the day, and
19 Dan had the example, I guess, of the pilot which
20 you guys have done with Bonneville. Right? I was
21 just curious, Clyde, how big of an opportunity do
22 you think that is in the Cal. ISO? I mean how

1 much of your load do you think has the ability for
2 you to shift it? You think you can actually solve
3 the problem that way, I guess is the question I'm
4 trying to ask.

5 MR. LOUTAN: I think it's going to be
6 significant. I do not really want to quote an
7 amount, but let's put these in perspective. I
8 anticipate the net load -- which is the load minus
9 your renewables on a weekend to drop -- I would
10 say by 2017, somewhere around 15,000 megawatts.
11 This weekend it dropped below 17,000. So we still
12 have another 8,000 megawatts of renewable to go
13 in, primarily solo. It's going to go in between
14 now and 2020. So I think your net load dropping
15 below 15,000 megawatts is realistic. And as I
16 said, we have a diverse resource mix. So when you
17 think about 10,000 megawatts of nondispatchable
18 generation on your system, and your net load in
19 the middle of the day, dropped to 13,000. You
20 have 3,000 megawatts of margin, let's say. And if
21 you need to have any kind of dispatchable energy
22 on top of that, you need to have another 3,000

1 megawatts, you know, to (inaudible) load bearing
2 capability, plus your regulation. So I would say
3 like another 4,000 megawatts or so. The other
4 thing that's going to be a challenge for, not only
5 us, but for all authorities is being able to meet
6 that frequency response obligation. So, in order
7 to meet that, as I said, every (inaudible) based
8 on your frequency dip, will have to have some
9 limited capacity on this system to be able to
10 react within 30 seconds. And this is going to be
11 from (inaudible) responsive load. Now we did a
12 study just looking at resources providing our
13 frequency response. And you need to have a
14 (inaudible) capacity. So when you think about --
15 if we do not think about storage, if we do not
16 think about tripping the load or allow a load to
17 participate, and you only rely on units and
18 government control, each combined site you plan to
19 commit -- let's say a 400 megawatt plant, you've
20 got a 40 percent (inaudible) that you've got to
21 deal with, which would aggravate an (inaudible)
22 situation. So it's a very, very complex problem,

1 so this is why we're looking at -- I think loads
2 can provide some of our frequency response really
3 quick. Storage can do it. Wind and solar can
4 definitely do it, but we have -- these are the
5 problems that we face today and then have smart
6 guys say, well, we can help you figure out how to
7 deal with that.

8 MR. CURRAN: So, look, Clyde, I won't
9 quote an exact number, and I think the reason for
10 that is that we're not sure yet and part of why I
11 wanted to highlight that pilot is, those are the
12 types of programs that we need, both on the DR
13 side and from a utility standpoint, to understand
14 what the capabilities are. I think we learned a
15 lot from the pilot in terms of what loads made a
16 good participant. One thing we learned that's
17 probably not surprising to hear, is that chillers
18 and refrigeration actually was fantastic in terms
19 of stability to go both up and down. Another
20 vertical that we looked at were paper mills. And
21 actually they proved to be effective. They
22 weren't as effective as chillers, but I think we

1 felt that if we could focus on loads like those,
2 and if we could have more opportunities to learn,
3 you know, what is it, what types of situations
4 actually cause problems for them. If you can
5 start to move into verticals like paper mills,
6 that's when you can really start to ramp up and
7 see a lot of megawatts.

8 MR. COWART: In terms of next questions,
9 I have Anjan, Mike, Carl, and then Chris.

10 MR. BOSE: It seems to me that you can't
11 get around the fact that you have to balance your
12 generation with load. And there are many policies
13 and market rules that seem to make it more
14 difficult. But policies and market rules can be
15 changed, but the load generation balance has to be
16 met. So the question is -- do we have the ability
17 to do the load generation balance right now? I
18 mean given that you will have to change the
19 policies anyway, if that gets in the way. That
20 is, do you have the information coming back in,
21 the measurements and so on, as you pointed out,
22 Fred. Getting the data in to make the decisions

1 at a four-second rate is not that simple. And
2 then if I think of all the layers of control
3 centers that you have between Cal ISO and down to
4 the distribution things, are we getting all the
5 information that we need to make the decision, and
6 we do we have the infrastructure to do it?

7 MR. LOUTAN: It's really simple to
8 balance that generational load if you have the
9 tools. As Fred has said, we needed flexibility.
10 So in real time, what you look at is the load of
11 frequency. So once your frequency deviates from
12 60, you know, it is negative or positive. You
13 have something we call a frequency bias, and you
14 know how much you are. But if you do not have the
15 flexibility on the system to meet that -- so, what
16 (inaudible) it is, have enough flexibility, second
17 is being able to predict in short-term what that
18 wind, solar, load variability is going to be. So,
19 even though some people have got the misconception
20 that you do a five-minute dispatch, and that would
21 take care of it. Because every five minutes you
22 dispatch your system. But remember, every five

1 minutes you dispatch, you make that decision to
2 dispatch 12 1/2 minutes before our five minutes
3 end, right? So now, when I started looking at the
4 variability you see with wind and solar in ten
5 minutes, is all I found is the megawatts. So by
6 the time you made this decision 12 1/2 minutes
7 ago, (inaudible) to meet a forecasted load, and
8 wind and solar drops off a thousand megawatts, it
9 catches you off, right? Now, the other thing too,
10 is when you tack on your forecasting errors that
11 you make on top of that, you're always lagging
12 behind. So this is where I would need labs. We
13 need universities to help us try to figure out,
14 you know, what's the best way to forecast
15 (inaudible). We thought that a persistent model
16 would do it. It's not going to do it. And
17 really, how well you predict what you are doing
18 because I have already started to see (inaudible)
19 correction increase on the system. You started to
20 see (inaudible). And then I started to see CPS
21 controls declining. So we know it's a real
22 problem.

1 MR. FLETCHER: Okay. The other thing --
2 it's really important to understand where your
3 frequency bias is. I don't want to get too
4 technical, but I'll say that the general rule of
5 thumb is one percent of your peak load, but if you
6 actually try to go out and build your frequency
7 bias up, you can actually get it up better. Our
8 frequency bias in our system is around 7.25
9 megawatts.

10 (inaudible), and our peak load is
11 300. So we'd only typically have
12 to be 3, but we're over twice that
13 because the more we can make the
14 frequency bias responsive, the
15 better you can ride through these
16 things.

17 MR. BOSE: But the frequency bias only
18 helps you in handling your traditional generation.
19 You're not using that to use the DR -- well you're
20 switching off, either spilling wind or switching
21 off loads.

22 MR. FLETCHER: Actually, we do look at

1 this because when you do the analysis, you don't
2 look at it from a generator standpoint. You look
3 at it from a load standpoint too. In fact, in our
4 system, about one quarter of that response is from
5 the load.

6 MR. COWART: Okay, Mike.

7 MR. HEYECK: This may be a comment that
8 should be made over a beer. I think at last count
9 in the U.S., and it might be North America, we
10 have 113 balancing authorities. And I think the
11 old concept of balancing authorities may have to
12 morph into something new with next generation
13 energy management systems. You may have a virtual
14 balancing authority, but the law of large numbers
15 is where it would help. When you have all the
16 renewable, all the demand response, you may have
17 microgrids coming in and out, and I just -- it's
18 really a comment that I think we're going to be
19 challenged in the future to maintain the current
20 paradigm of balancing authorities. I think if you
21 maintain your space, you can maintain your
22 identity, but there may be a virtual way to do

1 this and take advantage of the fact that the grid
2 is a large -- the law of large numbers works a lot
3 better than the law of small numbers. Just a
4 comment.

5 MR. COWART: Carl.

6 MR. ZICHELLA: Good comment, Mike. I
7 was thinking along the same lines, actually. It
8 seems like a lot of the problems that we're seeing
9 in California, are the result of California going
10 it alone, in terms of trying to deal with its
11 resource issues. And a recent study by the
12 consulting firm E3, really sort of emphasized that
13 in order to go deep with renewable energy
14 penetrations, you need to be much more
15 coordinated. We need a diverse portfolio of
16 resources, including energy efficiency, which we
17 haven't talked much about and DR. In looking at
18 incorporating the other technologies, like energy
19 storage, this has been sort of proven out.
20 Recently, PJM did a 33 percent study, indicating
21 that they wouldn't have a lot of problems, mainly
22 because they don't have to deal with 38 balancing

1 area authorities like we do in the west. It's a
2 real impediment taking advantage of the
3 efficiencies in the system because you're dealing
4 with teams and bilateral contracts, instead of one
5 market, in terms of optimizing the system. We
6 have to fix that. So I really agree that having
7 this proliferation of BA's is a bit of a problem.
8 It's like a bus being driven by 38 people, and
9 it's not going to work very well. We're
10 innovating in terms of policy and operations all
11 the time here, and the idea of doing some pilots,
12 I think, is useful. And there are some going on
13 in California, especially around San Onofre
14 Nuclear Generation Station retirement. That, I
15 think, is quite important. Another example is
16 looking on the distribution grid, and how you can
17 make bigger blocks of distributed generation
18 visible to the system operator. Proposals have
19 come up from the California Energy Commission to
20 look at zoning of distributed generation areas, so
21 that you can aggregate the output and have it
22 appear to be more like a larger solar plant, if

1 you will. That could be then operated much more
2 efficiently and integrated into the system. This
3 hasn't gone very far yet. It's an idea, but it's
4 an example of the kind of policy innovation that I
5 think helps, when we're looking at this.
6 Innovation also in operations to the extent that
7 we can get our investor owned public utilities to
8 coordinate more in California. It would be a big
9 advantage. We're leaving a lot of money on the
10 table. We're leaving a lot of reliability,
11 frankly, on the table too because mutual
12 assistance is limited between the IOU's and POU's.
13 Not that they're not connected at all, it is that
14 they're not connected enough. So I just wanted to
15 bring those issues up. Geographic diversity is
16 another one. It's a tool that we're not taking
17 advantage of enough, where we have uncorrelated
18 variability and generation sources outside of
19 California. We make our lift a lot lighter.
20 We're starting to take advantage of that with the
21 energy and balance market, which I view as a
22 plumbing for a broader energy market eventually in

1 the west. I think we're headed there because we
2 have to go there because the existing system was
3 not designed for the good of the future. It was
4 designed for a grid that is increasingly a grid of
5 the past.

6 MR. COWART: Chris.

7 MR. SHELTON: I wanted to say thank you
8 to the panel for being consistent, I think, in one
9 area, which is a focus on the characteristics that
10 we need on the system. I feel like this committee
11 and the meetings that I've participated in, has
12 maintained a focus on really the characteristics
13 of the system and of the resources on the system.
14 I'm glad to see that brought to us here by the
15 panel. Periodically, though, we do jump back into
16 very prescriptive technology discussions and
17 concerns about whether we need storage or we
18 don't, or whether renewable cause is an issue or
19 not. And I found it refreshing to hear about --
20 these are the real characteristics that are
21 needed, particularly as mentioned by the ISO. So
22 I think if we keep a focus on that, and there's a

1 lot we can do here on this committee to stay
2 focused on that, I think we will see resources
3 show up that have the characteristics that we
4 need. The market will bring them to bear, but we
5 have to make sure that they're transparent. So I
6 think that's what I wanted to highlight. Those
7 needs need to be transparent in our market
8 systems.

9 MR. COWART: All right, thanks very
10 much. Since I last spoke -- Anjan, you left your
11 card up. Are you -- all right, Paul and Paul.
12 Paul Centolella is first.

13 MR. CENTOLELLA: I want to pick up a
14 little bit on Anjan's comments and maybe reply to
15 Mike's a little bit with a concern. Clyde, you
16 raised in your talks some issues around what
17 happens on the distribution system, and the issues
18 that they and distributed generation can raise for
19 distribution. One of my concerns has been that,
20 as you get down into the distribution system, you
21 lose your ability to use the law of large numbers
22 because you're dealing with pockets of distributed

1 generation and other distributed resources on that
2 system. I guess what I would like to hear from
3 the panel is, more about where you are today,
4 particularly the folks who are working in
5 California in developing the real time
6 distribution operating systems, that are fully
7 loaded and integrated with what's going on at the
8 ISO at the transmission level. And to the extent
9 that we continue to have (inaudible) there, what
10 are the risks that we face in the near and long
11 term as we add more distributed generation and may
12 not have a fully integrated control system to
13 manage it at the distribution level.

14 MR. LOUTAN: That's a huge question.
15 That's something that we're going to start looking
16 at a little closer this year. You know, Ralph can
17 probably help me sitting back there. We attempted
18 something like this in the past. When you look at
19 a lot of the resources sitting out there,
20 typically what we do in the industry today, is we
21 net that load out. So on the transmission side
22 (inaudible) But you have a big piece of load

1 that's sitting out there, that's supplied by
2 (inaudible) no kind of frequency response, so it's
3 something that we're missing in the technical
4 studies, that we need to start looking at. So
5 this year, we're going to look at 4,500 megawatts
6 of distributed (inaudible). What's the impact on
7 losing a big nuclear plant on transmission? So
8 that's the first step we're going to take, and as
9 I said, you know, we will be looking at to
10 implement other devices other than distribution
11 that can help us gain visibility as to what's out
12 there. One more thing, we are working with
13 forecast providers. They'll have a better feel as
14 to how much distributed generation we have out
15 there. So we started to get a forecast on that.

16 MR. COWART: Paul.

17 MR. HUDSON: To the credit of the
18 (inaudible) leadership this last year, as we've
19 headed toward 14, 15 (inaudible) wind, they issued
20 a white paper that essentially discussed a bottoms
21 up review of ancillary services. Their thinking
22 was that since the formation of the single control

1 area back in 2001, that they were really relying
2 on ancillary services of the past, since the mid
3 nineties. And they wanted to take a very bottoms
4 up white board approach to what the next
5 generation of ancillary services ought to look
6 like. And I guess my question for Clyde and Dan
7 in particular is, as you've looked across the
8 organized markets around the United States, they
9 tend to be very incremental in movement in terms
10 of taking on activity as we see this technological
11 change. And I guess I'm wondering, how much is
12 this sort of white board approach to looking at
13 ancillary services as a whole, from a bottom up
14 perspective, as opposed to this very
15 incrementalist approach and the way they've just
16 begun the process in Arcon.

17 MR. LOUTAN: Well, I think in analysis,
18 we are looking at it holistically, but a
19 year-and-a-half ago we started looking at load
20 falling product. We were thinking about something
21 completely different from traditional regulation
22 or spinner reserve. We found out that -- let's

1 try to go after flexible capacity. So part of our
2 request to CPUC was when we do all of our RA
3 showings, we need to have a portion of that as
4 flexible capacity. But one of the things -- and
5 I'm working with some of your folks at Ellcott.
6 We're trying to look and see if we do need to have
7 a frequency response product on the system by
8 2016. In May, we're going to get together and see
9 -- I like some of the things you guys did in
10 Texas. We want to see how we can learn from what
11 you're doing. Hopefully, we may decide to come up
12 with a frequency response product.

13 MR. CURRAN: I think we feel that taking
14 a white board approach is absolutely appropriate,
15 particularly with a product like demand response,
16 where we don't have decades and decades of history
17 to look back on. I think what we feel is
18 appropriate when you take that approach, that you
19 incorporate the types of pilots that I was
20 highlighting, to make sure that we can understand,
21 not just what your objectives are, but what the
22 capabilities are of the types of loads that we try

1 to incorporate into these different products
2 because really what we found is that it's the fine
3 details that can really make or break whether or
4 not incorporating load into an ancillary service
5 program can really be effective.

6 MR. COWART: Ralph, are you next, or
7 Wanda. You guys -- I didn't see.

8 MS. REDER: Great presentations. I just
9 wanted to make sure when we have you here, that we
10 get your insights on how DOE can help. There's
11 clearly a lot of challenges. We've learned a ton.
12 Certainly the activity in California has advanced
13 our understanding, but I'm really curious what you
14 think we can do from a DOE perspective to kind of
15 keep the ball rolling and give us, like Paul said,
16 from an incremental view into, you know, mainly
17 full stages that we can get past these barriers.

18 MR. LOUTAN: I think you are helping.
19 We have a project that we kicked off about a month
20 ago that was funded by DOE. We have other
21 projects that DOE did fund, that is helping us
22 (inaudible). So I think you are helping.

1 MR. FLETCHER: You have helped us out a
2 lot with the smart grid grant. And we're always
3 looking at new ways in working with your staff and
4 on ways to move the envelope. Right now, I think
5 helps on some of the studies and ways to help us
6 analyze the demand response, and ways so we see
7 how things are working regionally, so we can learn
8 from other parts of the country.

9 MR. CURRAN: Just on the point of access
10 and on the point of having controls in place.
11 Those are the foundational kind of needs.
12 Actually I think, through the -- DOE could look
13 for grants that could increase the proliferation
14 of those types of advance metering because a lot
15 of what we see is advanced metering, but not quite
16 advanced enough to get us to where we want to be
17 with the smart grid. And again, just, you know,
18 advocacy on the side of increasing access to these
19 markets because there's still just a lot of
20 regions where load does not have the capability to
21 participate. They've kind of shown that pyramid
22 -- even starting off with access to basic forms of

1 DR. That can really be a catalyst to fostering
2 the development of the advanced capabilities. I
3 think we need to manage a lot of these challenges.

4 MR. COWART: It looks like we're at the
5 end of our time, so this gets to be the last
6 question, Ralph.

7 MR. MASIELLO: I don't know if I can
8 handle that responsibility, Richard. Clyde, since
9 you mentioned, you threw my name into it -- two
10 different questions for the three of you. One is,
11 you started to talk about what happens with a big
12 unit trip, when we have all the DG. So this
13 winter the EAC recommended to DOE that synthetic
14 inertia and synthetic governor response are worthy
15 of investigation so that demand response or
16 storage or electric vehicles or whatever, could be
17 providers of those things. So I'd like comments
18 on that, and then second, what about -- I'm going
19 to use the word non-traditional communications,
20 for getting visibility and control of distributed
21 resources? And a favorite example, of course,
22 would be electric vehicles, where the car knows

1 perfectly well what it's doing, charging or
2 discharging and can control it, then why couldn't
3 you us the communications on board on the car as
4 opposed to utility communications? So those are
5 my questions.

6 MR. LOUTAN: So the synthetic inertia --
7 we had GE help us because they have the dynamic
8 models for wind and so on. One of the things we
9 found is, you do get a response from wind plants.
10 But in order to get that response, the turbine for
11 the wind plants, they slow down a bit, to give you
12 that response. After about 8, 10 seconds they
13 take it back, and they take it back with interest.
14 Which means they take back more than they give you
15 in 8 to 10 seconds. So, what we're struggling
16 with right now is, and I think folks are going to
17 have this conference on the 22nd of next month, on
18 the frequency response. That's going to be part
19 of this discussion. If we make frequency response
20 a short term product, or let's say a short-term
21 requirement, then it would simplify a lot of
22 things. If we're trying to make the synthetic

1 inertia now, from wind plants, beyond let's say, a
2 minute, all right, or beyond 30 seconds, then I
3 think a lot of things are going to come into play.
4 Because they're going to pull that the response
5 that they give you in a short period of time,
6 which is going to aggravate the situation, so if
7 the standard comes out such that you need to give
8 me that response to sustain it, then I think a lot
9 of things are going to be -- this is just me --
10 I'm not the California ISO, would have some
11 negative impact, one, in that the wind plants
12 going to pull back that response they gave you.
13 Two, is you do -- let's say you have a bilateral
14 agreement, with an entity outside, not a BA,
15 you're going to have to reserve transmission for
16 that entity to provide you with this frequency
17 response, if it has to be sustained. Nor
18 remember, the way this is going to work is, any
19 balancing authority with any interconnection has a
20 problem. All the other (inaudible) need to
21 respond, which means to say, you do not no where
22 that event is going to happen. For instance,

1 let's say California buys a hundred megawatts of
2 frequency responsive reserve from BPA. Colorado
3 has an outage. Now, how are you going to reserve
4 that transmission to ensure BPA provides this
5 megawatts that's sustainable. So I think we
6 really need to think about what it is we're trying
7 to solve. I think if frequency response is only
8 there to arrest frequency and stabilize your
9 system following a disturbance, then you're
10 limited to the contingent way to provide the
11 conditions of reserve to restore the (inaudible)
12 back and bring the system back to normal. I think
13 if we limit it like that, it's going to work, but
14 if we try to extend frequency response beyond a
15 30-second time frame, it may have some negative
16 impact. Again, just to quantify, this is not the
17 California ISO, this is Clyde -- this is his
18 opinion. Oh, and on your second question on your
19 non-traditional communication, Ralph, anything
20 that would give us the response that we need in
21 the time frame that we need it in, once they can
22 get through NERC and cyber security that everybody

1 else worried about, I'm happy. So I'm technology
2 neutral, we point out that these are the
3 characteristics we need for primary control,
4 secondary control, tertiary control, whatever can
5 provide it to meet those characteristics, I'm
6 happy.

7 MR. COWART: All right, I think that's
8 the last word. I'm happy. We're going to take a
9 ten-minute break. Is that okay? And, Wanda, then
10 you're up next. Is that right? All right.
11 Thanks very much. Short break, and please come
12 back immediately.

13 (Recess)

14 MR. COWART: Okay, Wanda, you're in
15 charge.

16 MS. REDER: This is the smart grid
17 subcommittee update. Essentially, what we do this
18 time of the year for those of you who are new, is
19 give a high-level view of the action plan for the
20 year, and status of activities. To set a little
21 bit of context, most of you probably know that we
22 have about 7.9 billion dollars of smart grid

1 projects that are going through. They were
2 released in 2010, as part of an ARA effort. So
3 we're four years into a five-year run on those
4 smart-grid projects. Some, you actually learned
5 in the last panel, we're starting to see the
6 benefits and the lessons learned from those. So,
7 the recommendations in the last report definitely
8 highlighted the need to do lessons learned and
9 socialize that activity. There's a lot of work
10 that's underway in order to do that.

11 Smartgrid.gov has featured many reports. One of
12 the most recent things that happened was a
13 conference that was held in Washington D.C. in
14 February, where many of the program managers,
15 Hank, I know Merrill Smith's here, Joe Paladino,
16 and Dan Ton, for example, all were a part of that
17 conference, where they featured award recipients.
18 And we really got some rich conversation going on
19 the lessons, and what they thought were next
20 steps. So, I want to congratulate and thank all
21 of you, both from DOE and NIS, that helped put
22 that on. All of those PowerPoints are available,

1 and we'll send the links out for that. They were
2 organized in six different themes, and a summary
3 will be available with that as well. So, thank
4 you.

5 And that really is a springboard onto
6 what the next steps are for the smart grid
7 committee in 2014. We have three speakers today.
8 Chris Peters actually has been working on a paper.
9 It's been finalized for awhile, but since we
10 haven't met for some time, he's going to discuss
11 it, and then we will ask for full EAC approval.
12 And that, of course, is on the security governance
13 aspect. And then the next speaker, Paul
14 Centolella will be talking about regulatory
15 models. And there's been some work on a
16 subcommittee within smart grid to talk about
17 information and tools to support future regulatory
18 models, so we'll have some discussion time and a
19 PowerPoint. I think that committee has done a
20 really good job in identifying the elements, and I
21 want to make sure that all of you have input early
22 on. The goal is to get that paper finalized

1 through the course of 2014. And then following
2 Paul, we'll hear from Merwin Brown on another
3 piece of work, distributed energy storage, and the
4 integration of that. Naturally, the panel that we
5 heard, will be an input to that piece of work.
6 This is unique, in that it is a jointly sponsored
7 piece of work between the storage subcommittee and
8 the smart-grid subcommittee. And so, Merwin's got
9 an outline, and we will, you know, have input to
10 that. And he'll be off and running to put the
11 paper together through the course of 2014.
12 Another piece that will be on the table tomorrow
13 is a joint committee work, that is the technology
14 R&D roadmap for the 21st century electric grid.
15 Clark Gellings has been leading that effort.
16 Billy Ball's been helping him. And that actually
17 is joint between smart grid and the transmission
18 committee, so Mike will bring up that piece of
19 work tomorrow when we talk about the transmission
20 subcommittee work. So, lot's going on, and with
21 that then, I think -- are there questions before
22 we turn it over to Chris for the cyber governance

1 paper?

2 MR. COWART: I just have one question
3 about the time frame for the cyber governance
4 paper. Maybe I'll ask him. What are you
5 expecting?

6 MS. REDER: Oh, ready for EAC approval
7 on the paper, today.

8 MR. COWART: Okay.

9 MS. REDER: Any other question? Okay,
10 Chris.

11 MR. PETERS: Okay, thank you, Wanda. As
12 Wanda said, we're looking for approval on the
13 governance white paper. Just to refresh
14 everyone's -- just to go over some of the
15 highpoints of the paper, just to refresh
16 everyone's understanding, on what we put together
17 -- this paper has gone through several iterations.
18 The paper's gone through several iterations.
19 We've taken the feedback from the EAC members, and
20 we even shared a pre-draft with DOE, just to get
21 some feedback from their perspective. So, the
22 draft you have in your folders, is the final

1 draft, that has the feedback incorporated into the
2 document. And I think the document is pretty
3 timely. Because when we first started talking
4 about enterprise or shedding some light, and
5 putting some more focus on enterprise governance,
6 we've had some significant events. The NIST
7 framework 1.0 was released. It has a section in
8 there on championing enterprise security
9 governance, the C2M2 model has a portion that
10 highlights the important of governance. And we've
11 seen some high profile events in the industry,
12 with Metcalf. We at Entergy had our own set of
13 attacks in Northeast Arkansas, and we've had
14 several high-profile breaches as well. And what
15 I've seen from the evolution standpoint, since
16 I've been in my role at Entergy, I've seen the CEO
17 step up, and the boards take a more active role,
18 not only at my company, but at other industry
19 entities as well. So they're at the forefront of a
20 number of these issues. They're dialoguing and
21 sharing best practices amongst themselves.
22 They're dialoguing with the trade association.

1 They're engaging on Capitol Hill on a number of
2 these issues, and we're seeing a dramatic, I
3 think, turn in focus at entities because cyber is
4 a CEO and board level issue now. And what we are
5 recommending to DOE is that we just shed some
6 light on this. We're not prescribing -- instead
7 of governance practices, we're looking to continue
8 for opportunities to create CEO awareness.
9 There's been some good activities that have taken
10 place at DHS, with FERC, and on Capitol Hill, that
11 I think has been real productive. We want to
12 leverage the C2M2 model where we can. We
13 recommend that we continue looking for classified
14 briefing opportunities, anything that's going to
15 help CEO's understand the cyber threat, and the
16 importance of making the investments that they're
17 making in workforce technology and physical
18 security improvements. And then lastly, we also
19 recommended that they conduct a study to look for
20 and identify industry best practices, that can be
21 shared across multiple sectors around the areas of
22 governance. And with that said, I'll take any

1 questions anyone has on the paper.

2 MR. COWART: Okay, any questions? Well,
3 I have one. At the very end it's for information
4 contact, but it's blank?

5 MR. PETERS: There should be two email
6 addresses on there. Maybe yours was cut off. But
7 I listed myself as a contact, and Amy Bachman, as
8 a former IBM cyber SME that helped get this in
9 final draft as well. So, we'll make sure those
10 are on the paper.

11 MR. COWART: And a second question --
12 was there any committee discussion of the need to
13 elaborate more on what C2M2 means? You're
14 recommending that we recommend promotion of the
15 model, and the model is named, but not described.
16 So, I'm just asking whether that was -- whether
17 someone --

18 MS. REDER: An easy fix might be to link
19 to all the materials that are available on the
20 website, so people actually can download the model
21 and download --

22 MR. PETERS: I think we do have links to

1 the model. I think what we were driving at there
2 is the C2M2 does call out governance as something
3 that needs to be (inaudible).

4 MR. COWART: Oh, it's in the references.

5 MR. PETERS: Right.

6 MR. COWART: Any discussion on this
7 paper? David.

8 MR. TILL: Well, this is a question, and
9 it sort of reflects my activity with the tech
10 team, where we're always looking ahead, trying to
11 think about, how does this infrastructure need to
12 evolve, not just the physical part, but also the
13 institutional component as well. And so my
14 question is, how do you bake cyber security into
15 this evolving system. A lot of the effort is
16 focused on, here's what we can do now, or what we
17 should be doing now, what we need to do now. But
18 looking ahead, how do we bake it in, and not try
19 to -- we have the opportunity to bake it in now,
20 but I'm not sure exactly what we need to do to
21 follow through with it.

22 MR. PETERS: I think from my own

1 personal experience, I look at the past four years
2 in my company, Entergy. You know, we were, I
3 think as regulations came down, and we realized
4 that they were a lot more in depth and complex
5 that we originally anticipated, and we look at the
6 evolving cyber threats, we've been in kind of a
7 bolt on mode. We were in a bolt on mode for about
8 18 months. We were trying to bolt on cyber into
9 our firewalls, and strengthen our workforce,
10 things like that, but when we shifted from the
11 bolt on to a bake in, where we took a step back
12 and looked at our governance structures, we looked
13 at our overall strategy, and we developed a
14 five-year strategy, that mentality shifted from a
15 bolt on to bake in. So now we're very proactive
16 in how we get ahead of investments, how we prepare
17 for standards, how we procure technology, making
18 sure we're being consistent across the enterprise.
19 So, I think it starts at the top. It has to be a
20 strategy that's driven from the CEO and pushed
21 down. And then from that standpoint, you're able
22 to define roles and accountabilities because I

1 think, especially companies our size, what happens
2 when you start looking at the wholistically,
3 accountabilities and authorities are spread out
4 across the enterprise. There's no single points
5 of contact. Things are very disparate about the
6 way people procure and insert cyber technologies
7 into the enterprise, so I think we took a broader
8 approach, and we started -- we went back to the
9 beginning and looked at our strategy and looked at
10 our governance models, and then we started to
11 cascade that strategy and that focus fro there
12 down, all the way to the substation level, into
13 the control room in the generation facility. So
14 that has proven to be very effective for our
15 company. I think it's a model that works. It's
16 fundamental. It sounds kind of basic, but I think
17 it's pretty effective when it's topped down.

18 MR. COWART: Clair.

19 MR. MOELLER: Yeah, I'd like to give a
20 commercial for the maturity model because
21 essentially what it is asking you to do, is judge
22 your capabilities to see and manage risk, which is

1 the actual security question rather than be
2 compliant with SIPS, which is a laudable goal, but
3 won't make you secure. And the process of
4 implementing that maturity model, helps move you
5 from the bolt on to the baked in, at least that's
6 been our experience.

7 MR. COWART: Paul.

8 MR. CENTOLELLA: So, I think that the
9 focus of this is really on looking at, and
10 empowering governance, as opposed to looking at
11 compliance. And that I think, is a really
12 significant change, and ultimately it will --
13 given that we really don't have systems in place
14 in the electric power system that have been fully
15 vetted for security. This will be an evolving
16 process, and so looking at this from a governance
17 standpoint will then allow for the development of
18 architecture, the development of (inaudible).
19 There's some very good work going on in some of
20 the IOU's. There's some very good work going on
21 at NRECA, and looking at how this evolved, but it
22 will be a process, and a process that should be

1 supported. And I think one of the questions we
2 didn't get to, but was raised in another report
3 that came out a couple of weeks ago, was whether
4 or not governance ought to focus additionally on
5 industry wide organizations, comparable to what we
6 have for info on the nuclear side. It really
7 begins to look at how you move towards excellence
8 and away from your compliance. And that might be
9 -- at least a discussion that the department might
10 want to facilitate going forward about whether or
11 not that kind of institutional arrangement could
12 help advance where we need to go in this area.

13 MR. COWART: Merwin.

14 MR. BROWN: In the report you mention a
15 characteristic of effective security governances.
16 As an executive owner of enterprise security, a
17 lot of times that's the chief information officer
18 in some companies. This is a question of a person
19 feeling I have about this, is that the function of
20 this particular position -- one possibility is
21 it's seen as a fixture that's going to be there
22 forever, like president of finance and all of

1 this, or the other one is, is that this is a
2 transient position that is to bring about a
3 transformation in the company that causes, as you
4 mentioned, the culture to be security oriented, so
5 that in time this position is really supposed to
6 work itself out of a job because it becomes
7 innate. The security becomes just built in to the
8 whole utility system. I guess I'm asking, is that
9 something worth mentioning here, on what was meant
10 by that? Whether that is a transformation kind of
11 position, or it's a permanent fixture?

12 MR. PETERS: I personally think it's a
13 permanent fixture, and I don't want to be to --
14 you know, maybe this is a little too prescriptive.
15 Companies have a number of different options and
16 means to kind of consolidate the way they apply
17 cyber. The way they employ physical and personnel
18 security, so ideally in a perfect world, it would
19 be a permanent role at a company, but it's also a
20 very politically sensitive issue because most
21 companies are not organized around a central
22 security figure. It's been a culture change for

1 our firm, just to have me -- my position was
2 created in 2010, as a VP of SIB. That was a
3 significant change for our company that took some
4 time for everyone to get their arms around about
5 what the role was. But I think, as I say, we
6 don't want to be too prescriptive in here, but I
7 think the more accountability you can have for
8 cyber, physical, and personnel security, I think
9 the better the organization -- it's just easier to
10 manage in a complex enterprise.

11 MR. COWART: Billy.

12 MR. BALL: I was actually just going to
13 -- some follow up comment to Paul's comment -- I
14 think it's a great idea. Until a few years ago,
15 we actually did start an info like organization in
16 the transmissions phase, so the North America
17 Transmissions -- we do exactly those type things.
18 Actually, the different individuals here whose day
19 job is either with a utility or at an RTO, I think
20 everybody here, their companies are all members.
21 There's 70 something members, and that's proven to
22 be a very effective way to share best practices

1 across a number of areas, including security,
2 physical, cyber, many different things, and to
3 push each other on towards excellence, so it's
4 been a real positive in Transmissions.

5 MS. HOFFMAN: I just have one request
6 for everybody on the AT to think about as we move
7 forward, and my strategy is -- as we move forward,
8 that if I get asked, and probably will get asked,
9 how do we define success in this area for cyber
10 security, I'd like to be able to say that the
11 industry has the following capabilities, you know,
12 they've identified a security officer, they have
13 the capability of monitoring, you know, their
14 positions, things like that. So as you move
15 forward, just keep thinking about the measure of
16 success and how we package those measures of
17 success. The other thing is -- I keep thinking
18 about on the physical security side -- if we need
19 to have some sort of -- I don't want to say
20 maturity model, but some sort of discussion on the
21 physical security side to help take all of the
22 best practices, and put it down as more of a

1 process. I don't know, I just put it on the table
2 because this is a hot topic right now. I know
3 that it's -- the physical security side is better
4 defined than the cyber, where the cyber was kind
5 of the wild west of how do we get our arms around
6 it. But I just want to know if there's anything
7 else we should be doing. One of the things may be
8 just continue to talk about how is the landscape,
9 and how is the landscape changing? But other than
10 that, I don't have any -- just ask your thoughts.

11 MR. HUDSON: Chris, my question is
12 really focused also on metrics. And I'm wondering
13 if there is any entity that is directly
14 responsible, for example, for saying of the 240
15 plus investor owned utilities, we've conducted
16 this type of C2M2 briefing for 107 of them. Is
17 there anybody sort of keeping track of the
18 executive turnover, the turnover amongst the board
19 of directors, that type of thing that is keeping
20 metrics on the type of softer activity that we've
21 outlined in some of these recommendations.

22 MR. PETERS: I don't know if I'm in a

1 position to speak to that. I know there's
2 extensive metrics being kept from the DOE
3 perspective on their engagements, when they do
4 their C2M2 reviews.

5 MS. HOFFMAN: We're going to start a
6 benchmarking process as well, as part of the C2M2
7 work within industry on, you know, the information
8 we select from a benchmarking point of view.

9 MR. PETERS: Now Paul, from a physical
10 standpoint, BHS has put together some extensive
11 industry metrics on resiliency and physical
12 security measures, where they will come out and
13 evaluate your company, your key facilities, and
14 benchmark you against a set of industry metrics
15 that they've gathered over the last several years.
16 They're pretty robust, and as good as I've seen
17 from a physical security standpoint.

18 MR. COWART: Mike.

19 MR. HEYECK: Pat, that was a great segue
20 in the grid resiliency paper. Attached is the
21 grid security paper, and it was high impact/low
22 frequency including terrorist attacks. And we

1 kind of brushed by cyber issues, and I identified
2 grid vulnerabilities. I identified best practices
3 to address and so on, and the recommendation is
4 more to the subject of convening and facilitating
5 technical conferences and things. And so I think
6 we've got it covered, and I think we could leave
7 this in cyber space.

8 MR. COWART: Bob.

9 MR. CURRY: I'll continue the segue. As
10 a New York commissioner, when I first came on,
11 which is now, eight years ago, I was dismayed by
12 the fact that best practices were not routinely
13 circulated among, not only the IOU's, but also in
14 the arc we have the Long Island Power Authority
15 and the New York Power Authority. I think to the
16 extent that the DOE can help identify and find
17 merit in best practices and get them around and
18 circulate them in some fashion at the board level,
19 that that would give tools to -- I've spent a lot
20 of time in my career being council of boards of
21 directors, and oftentimes the CEO thinks the best
22 people to have on the board are the people that

1 don't know anything about his or her business. So
2 if someone ends up by accident being chairman of
3 the security, cyber and physical committee, having
4 some sort of frame of reference sanctioned by the
5 DOE which comprises best practices, I think would
6 be a very significant tool. Trying to, as a
7 commissioner, who as we all know is not supposed
8 to do anything -- only the chair is supposed to do
9 something. But as a commissioner, to get best
10 practices accepted was a very painful experience.
11 So I think we're moving in the right direction,
12 having the Homeland Security checklist on the
13 physical side, talking about these other elements
14 from a corporate governance side, I think would be
15 very much to the advantage of, not only in
16 investor-owned utilities, but also the other
17 utilities that function, including some within,
18 obviously, the DOE.

19 MR. COWART: Carl.

20 MR. ZICHELLA: Yeah, it seems like when
21 you talk about physical security, prioritization
22 is an important concept, and to the extent that

1 working with CEO's and others to help identify the
2 top priority locations to begin with, where the
3 most damage would occur, should an attack happen,
4 would be the logical place to begin. That was one
5 of the takeaways, I think, from Chairman
6 Wellinghoff's concerns about physical security was
7 identifying and protecting the highest value
8 substations would be a good bang for the buck, so
9 to speak, but also a very big bang for your buck
10 in terms of security. So that might be something
11 to think about in terms of taking that concept
12 down a little further to the individual companies
13 themselves. We were very lucky in a California
14 instance, that it wasn't perhaps the most critical
15 places that got attacked.

16 MR. GELLINGS: We had a really hard time
17 in the national academy when we did the study on
18 terrorism. In fact, there were some who wanted to
19 identify what these priority targets were or are.
20 You might as well paint a bull's-eye on them. We
21 just really can't do that. I've gotten stung
22 already, repeatedly, being forced to talk about

1 Metcalf, and I really won't because I don't know
2 anything, but what a reporter said in the Wall
3 Street Journal. I haven't seen the FBI reports.
4 I don't know what kind of weapons were used, or
5 how poorly they actually carried out that attack
6 because if there were 100 rounds of ammunition
7 fired, I can tell you that any one of us could
8 have done that with a lot fewer rounds and done it
9 more precisely and done a hell of a lot more
10 damage. And why would you cut telephone cables
11 that don't even matter to that substation. It
12 makes no sense at all, so no, I don't think we can
13 do what you're suggesting.

14 MR. HEYECK: And just to piggyback,
15 Carl. I think that's just the identification of
16 the top 100, but I think what you may be getting
17 at is making sure the top 100 is in a way cloaked,
18 as to its security, rather than putting opaque
19 fences on the top 100 of the 100,000 substations.
20 And I think to that approach, I think we would get
21 --

22 MR. COWART: I just want to comment that

1 it's interesting that Clark knows nothing about
2 this event. Billy.

3 MR. CURRY: This is on the record.

4 MR. BALL: I won't comment on that
5 comment. But I certainly agree with the concerns
6 Clark mentioned, and I think my only hesitancy at
7 this point, for us to ask DOE to also jump into
8 this conversation around identifying priority type
9 facilities, is we have a tremendous amount of
10 activity already in that space, and having
11 government agencies duplicate each other at this
12 point, as someone who has to deal with this on a
13 day-to-day basis, isn't helpful. And so I don't
14 think there's a lack of good people trying to do
15 good things at different agencies. And so, I
16 actually think this one is pretty well covered,
17 especially now that we've gotten this FERC order,
18 and something is going to happen in 90 days
19 anyway.

20 MR. COWART: I second that. This is a
21 wonderful conversation. I have the sense that it
22 could go on for a long time. Does anybody want to

1 make some final comments because I think we need
2 to move on.

3 MS. REDER: Yes, I'd like to call a
4 question.

5 MR. COWART: Has there been a motion?

6 MS. REDER: Yeah, I move to approve the
7 paper on cyber governance as written, making sure
8 that the contacts on the bottom are visible on the
9 final draft.

10 MR. HUDSON: I second Wanda's motion.

11 MR. COWART: Thank you. Any additional
12 comments? All right, all in favor say aye.

13 SPEAKERS: Aye.

14 MR. COWART: Are there any opposed? All
15 right, the motion is adopted, and the paper is
16 approved. Thank you.

17 MS. REDER: Okay, Paul. There's been a
18 lot of discussion in the smart grid subcommittee
19 on the need for, you know, sharing best practice
20 on the regulatory models, so Paul has taken the
21 charge of a subgroup to try and understand the
22 elements, and I think this PowerPoint does a

1 really good job of articulating all of the various
2 aspects that are under consideration.

3 MR. SUCCAR: As we pivot into Paul's --
4 I just want to make a quick logistic note. I
5 recognize that the committee is sharing
6 microphones, but it's very important for the sake
7 of the transcript that is being provided, that you
8 speak directly into your microphone and bring it
9 very close to you when you speak, so that we have
10 an accurate record. Thank you very much. Paul.

11 MR. CENTOLELLA: Thank you, Wanda.
12 Thank you, Samir. I'm going to talk about some
13 work that is in progress. There has been a
14 subgroup of the smart-grid subcommittee that has
15 been working towards the development of a paper,
16 that is really aimed at the question of what could
17 DOE do in terms of making information and tools
18 more available to regulators in those
19 jurisdictions that want to take a different look
20 at the regulatory framework, recognizing that the
21 regulatory frameworks that are in place will play
22 a significant role in the extent to which grid

1 modernization activities may go forward. So, the
2 subgroup has included Tom Sloan, Buck Curry is
3 going to join us, and there have been some
4 significant contributions from Val Jensen, who I
5 want to recognize, who is now cycling off the
6 committee, but has both himself and through some
7 of the staff at Commonwealth Edison made some
8 contributions to the effort as well. So the basic
9 premise for undertaking this paper is that
10 electric distribution utilities are being asked to
11 do a number of new and expanded functions that
12 relate to replace aging infrastructures, providing
13 higher levels of resilience and reliability,
14 enabling their customers to manage their power use
15 more effectively, managing demand through
16 (inaudible) optimization, integrating variable
17 renewable and distributed generation, which
18 creates a whole set of system operation functions
19 associate with it. As we just talked about being
20 a front line defender from cyber and physical
21 attacks, and managing a transition in the
22 workforce. This requires some significant new

1 investment in the period of slowly growing, or in
2 many cases declining sales. Five of the last six
3 years, sales in the electric power industry have
4 actually been down. And it will also require some
5 changes in the way distribution systems operate.
6 Historically, we built distribution to fit deep
7 demand, and expected operations to more or less
8 float on top of transmission system operations in
9 a world with, you know, literally (inaudible) of
10 respond and demand of resources that are
11 distributed out of the system. It will likely
12 require a very different kind of control
13 architecture and real-time operations at the
14 distribution level. And this is leading utilities
15 and regulators to rethink both business and
16 regulatory models. This is an example of just
17 some of the activity that is out there. This was
18 actually taken from an energy foundation slide
19 from a few months ago (inaudible) integrated
20 utility project, the Massachusetts grid
21 modernization proceeding, some new information
22 from the New York PSE, suggesting they want to

1 build a new regulatory paradigm, and other things
2 that are going on in other jurisdictions, where
3 there's clearly a lot of activity out there, and
4 DOE ought to be thinking ahead about how to begin
5 to support this activity. So, in terms of the
6 role that the department may have going forward,
7 there is clearly a role that we will not be
8 talking about in this paper, but is the sort of
9 underlying rule of developing the technologies
10 that will be needed for efficient real time
11 operation of an integrated transmission and
12 distribution system, where all of these variable
13 and distributed systems. This is an important
14 role, which I think certainly the committee should
15 come back and talk about. It is a role that will
16 require a complex layered federated control system
17 that largely does not exist today in the way
18 utilities operate, and will require an advanced
19 information architecture to support that and not
20 simply (inaudible) systems that run a dynamic
21 response for demand response over here and
22 (inaudible) management over here, and generation

1 management over here. It has to all operate as an
2 integrated grid, and that's a separate issue,
3 which is on the future work plan. We want to
4 focus in this paper on two different issues.
5 What's the role the DOE may have in developing
6 information and tools for utilities and regulators
7 that are looking at changing the regulatory
8 paradigm and making it possible for them to
9 consider other paradigms? And secondly, what's
10 the role the DOE may have as a convener to support
11 facilitated stakeholder discussions of emerging
12 models, both within individual states, where
13 there's not a regulatory proceeding and nationally
14 looking at the development of proceedings going
15 forward. So, if we look at then the category of
16 tool development, there are a number of areas that
17 we've identified for potential consideration. I'm
18 going to quickly run through these and talk a
19 little bit about some of them. This is going to
20 be a significant part of what we're working on
21 going forward in terms of developing specific
22 recommendations for where DOE might be involved in

1 the development of information and tools. The
2 first area is to create more consistent, public
3 reported data and distribution reliability. There
4 is data that's gathered by NERC and EIA. In some
5 states it's done in accordance with IEEE
6 standards. In others it's not. There are some
7 proposed revisions to the EIA 861, that are now, I
8 think, out for comment from OMV, that would at
9 least make clear where the data is gathered on a
10 standard basis and where it's gathered on some
11 other basis. There may be some further rule
12 beyond that, and actually moving towards more
13 consistent standards across the states.

14 Secondly, as we change the way
15 distribution operates, one of the things that will
16 be important in terms of regulators and utilities
17 looking at more forward- looking models, do they
18 have a way to evaluate and benchmark distribution
19 investments? And is the data that's available, as
20 we move to this new paradigm, does it support that
21 kind of activity? And this might be a look and a
22 review of the existing surveys, as well as the

1 FERC form one data, to see whether it, in fact,
2 provides appropriate levels of support.

3 A third activity where I know DOE is
4 already interested, is in updated the information
5 for the interruption cost estimator, the ICE
6 calculator, which has been used by (inaudible),
7 and some other utilities in doing distribution
8 planning, but it is based on primarily surveys
9 that were conducted prior to 2000. The underlying
10 data does not include some significant parts of
11 the country, including the northeast, and it
12 doesn't really speak to outages longer than eight
13 hours. So I know there's interest both on DOE and
14 (inaudible), trying to update that information to
15 provide a better basis for looking at the value to
16 different groups of customers of uninterrupted
17 services.

18 A final area here, that I think deserves
19 some attention, is an approach that is actually in
20 place in some European and South American
21 countries. It's called a reference network model.
22 So that if you're going to do a forward looking

1 approach to rate making, one of the ways to
2 evaluate revenue requirements is to look at what
3 would be the efficient cause in a reference
4 utility. So there's been some significant
5 development in this area. Basically, we're
6 looking at some very good distribution expansion
7 models that can, among other things, look at
8 what's the efficient investment, building out from
9 the existing system, or in a greenfield setting,
10 look at what the associated maintenance costs
11 might be. Look at losses, look at service quality
12 levels, and do that for both load growth and
13 increases in distributed generation. So we don't
14 really have that in place for utilities here. It
15 would be a development that DOE could look at and
16 begin to bring in to practice in this country as
17 well.

18 Another area is when we begin to look at
19 the demand side of the equation. So we've heard a
20 little bit today, there is a lot of interest, I
21 think, out there in looking at, how do you begin
22 to automate customer preferences in a way that

1 makes the grid operate more efficiently? So just
2 like we rely on Kayak to find us cheap airfares or
3 Pandora to match our music preferences, one can
4 imagine customer choice engines built into
5 thermostats and water heaters and other
6 electricity using devices, that take advantage of
7 either the thermal inertia of buildings or devices
8 or the flexibility that they have in being able to
9 select when they use power. There are a number of
10 issues that come into play in making this work.
11 Issues around standards, issues around ISO
12 settlement practices. Whether or not there's
13 access to RTO and ISO look ahead price forecasts
14 and the quality of those forecasts, and how that
15 works with integrating limitations in the
16 distribution system. These are all issues that
17 DOE might play a constructive role in helping
18 advance.

19 There are also, we now know as a result
20 of this (inaudible) pilots, some real benefits to
21 (inaudible) optimization. But that varies by
22 system, it varies by technology, and it also has a

1 clear revenue impact on the distribution utility
2 because it reduces throughput at the meter and
3 there is a need to at least pay attention to how
4 we're going to take that into account, so that
5 that does not become a barrier to doing something
6 that can have some rather significant impacts in
7 terms of improving the overall operation and
8 reducing the investment requirements in the
9 system. Going on now, looking at how we begin to
10 look at distributed generation, I was pleased to
11 hear about the working group on benefits and cost.
12 I think that that's important, but we also need to
13 understand that the benefits and costs will vary
14 by the system. It will vary by the penetration of
15 distributed generation in that system. So, for
16 example, in some systems it's due to generation,
17 (inaudible) to reduce costs as it cuts losses, but
18 then might require increased distribution
19 investments, as penetrations become larger, and
20 how do you create the tools that will enable
21 people to look at that. That's an important piece
22 of this, as well as the other pieces that David

1 mentioned in our discussion earlier.

2 There also then becomes an important set
3 of questions around distribution pricing and
4 rates. We historically had uniform rates across
5 the distribution system for different customer
6 classes. I question whether that's the kind of
7 pricing and rate structure that we need going
8 forward. Should it be more locational? Should it
9 be more time varying? Ultimately, should we be
10 looking at markets at the distribution circuit
11 level? And what might that look like, and how can
12 DOE create information and tools that can help
13 utilities and regulators begin to look at that
14 question?

15 There are then a whole set of issues
16 that have to do with assessing various kinds of
17 social costs, including impacts on (inaudible)
18 customers, methodologies related to potential
19 compliance with clean air act 111D requirements,
20 and other information compilations, related to the
21 social cost of carbon and other environmental
22 impacts, all might fit into that bucket.

1 And finally, there is, I think, going to
2 be increased interest in what's the role of
3 utilities in strengthening the innovation system?
4 We are at lease approaching over the next several
5 years, meeting what were the initial portfolio
6 standards, in many jurisdictions. I think there
7 will be a question of what comes next. And is it
8 simply more deployment of the technologies that we
9 have now, or should we be paying more attention to
10 developing the next set of technologies that will
11 begin to make cleaning for affordable, and what's
12 the rule of utilities and regulators in looking at
13 that. There are a number of regions of the
14 country, where there are regional innovation
15 clusters. There are regulators that are looking
16 at, you know, set asides for increased research
17 development and demonstration funding, and I think
18 we need to be in a position to support that from
19 the department, in terms of both helping them look
20 at models that make that possible, and also
21 linking those efforts to existing department
22 programs.

1 So those are areas of informational tool
2 development. The other area where we are
3 considering bring forward recommendations, is in
4 what could be the role of DOE in facilitating
5 conversations, both at the state level where, for
6 example, in Massachusetts, we started with the
7 department sponsoring a multi-party working group
8 that did five or six months of discussion,
9 beginning to get a lot of agreement about both
10 remodernization in general and potential
11 regulatory frameworks before beginning a formal
12 DPU proceeding. That's one model. Another model
13 is regional or national discussions to begin to
14 educate stakeholders and regulators about what
15 potential models might be out there, and how they
16 might begin to consider these alternative
17 frameworks.

18 So these are areas in which our
19 subcommittee is looking at bringing
20 recommendations to the EAC. We would welcome
21 additional involvement and participation in
22 helping us pull together this paper, and would

1 welcome your feedback on the thoughts we put
2 together so far. Questions?

3 MR. COWART: Mike.

4 MR. HEYECK: This is far-reaching and
5 very welcome. Yes, the business model will
6 change. One of the things I keep on mentioning to
7 folks is that when my water heater breaks, I call
8 a plumber. And there's a void of service
9 providers. And I'm wondering what the group, or
10 should the group make sure that the boundary
11 conditions are set. There's the market boundary
12 condition, and then there's the competitive space
13 boundary condition from behind the meter
14 standpoint versus what the utility would do.

15 MR. CENTOLELLA: I think that's actually
16 a very interesting issue. I think it's an
17 interesting issue for discussion. I'm not yet
18 clear what DOE can do beyond facilitating
19 discussion in that area because you end up with
20 things that are natural monopoly functions, both
21 in terms of the wires in and terms of system
22 operations. You end up with things that are

1 sometimes called adjacent service, that is things
2 that the utility can do, and is well-positioned to
3 do, but are potentially competitive and may not
4 have your best competitive market there today.
5 And then you end up with things that are purely
6 competitive services. And how that plays out, how
7 the interfaces are defined, is a very important
8 question, I'm not sure we've yet thought through,
9 you know, what that looks like, and I don't know
10 what I would suggest to DOE at this point in terms
11 of tool development, other than facilitating
12 discussion on that issue.

13 MS. REDER: Thank you. Excellent
14 presentation, Paul. Thank you. I'm wondering,
15 since there's so many rich discussions that are
16 already going on around the country as you
17 described in that map, and I know I've been
18 involved in a couple of them myself, that rather
19 than starting anew, is there some way that we can
20 build from those discussions and bring those
21 interests together, so we don't recreate the
22 wheel. I know that several of these organizations

1 have been looking at, and also some state
2 commissions that are involved in that, for
3 example, in Minnesota, my state. It would really
4 enrich the discussion and maybe we could move the
5 ball forward a little bit more by building on some
6 of that work that's already been completed.

7 MR. CENTOLELLA: I agree. I think that
8 there are some efforts to try to do that, but
9 certainly the department could help facilitate
10 that kind of coordination.

11 MR. COWART: Sonny.

12 MR. POPOWSKY: Thanks, Paul. I think it
13 is a very valuable project. My only concern is to
14 make sure that the focus is, as you said, on tools
15 and information, rather than prescription of
16 policies to state regulators and state legislators
17 for that matter, who may have to change a lot of
18 public utility codes around the country to make a
19 lot of these things work. And I think your
20 presentation, and I think even what David said
21 this morning when he was talking about the benefit
22 cost initiative, focus on metrics and tools to

1 help along the discussion, rather than be at all
2 prescriptive. So, I just urge you to keep that in
3 mind.

4 MR. CURRY: A follow-up on the dialogue
5 -- first to the point that Sonny made, and then
6 follow-up on the dialogue, Paul, that you had with
7 Mike. The hardest part for state commissions, but
8 more importantly their staff, is to address the
9 fact that distributive generation is actually
10 competitive with the monopoly. Distributive
11 generation has some assets that may 30 years, at
12 least Solar City hopes they do. They may not last
13 30 years, but you're looking at the need, as Sonny
14 points out, to change the minds of legislators,
15 perhaps started with state commissions, but also
16 going through the staff. And I've made some
17 efforts at NARUC to make certain that the finance
18 accounting staff meetings that occur, that aren't
19 in sync with the commissioner meetings have folks
20 addressing the assembled staff members to focus on
21 what you and Mike were talking about -- clearly a
22 monopoly and in the margin, clearly competitive.

1 And the reaction of the New York State staff,
2 which is the only one I can speak to, is that
3 they're not keen on someone using the credit of a
4 monopoly, which is very well strong and
5 strengthened and gets a good interest rate, to
6 finance what might be viewed as a competitive
7 adventure. No more than the pipes are willing to
8 consider putting new gas into New England -- my
9 apologies to Gordon -- on a speculative basis
10 because they have a great deal now. They have
11 sufficiently committed pipes at a utility credit
12 rating, and then FERC can get an enhanced rating,
13 and they keep the Delta in between, and it works
14 perfectly. Why break it -- well it isn't broken,
15 shall we fix it, but yet it is broken. So the
16 hardest part is the delicacy that you, as our
17 leader and we, as a committee, are going to have
18 to do to address the basic sophistication level
19 about financing, about the costs, and about how to
20 make it work. I'm of the view that the middle
21 level should be given to the utilities as a way of
22 keeping them going, but we'll see how it

1 progresses.

2 MR. CENTOLELLA: All I'll say to that is
3 I think there's going to be an interesting set of
4 discussions in New York, given the statements that
5 have been made publicly by certain people.

6 MR. CURRY: The good news in New York is
7 nothing will happen until after the November
8 elections.

9 MR. VAN WELIE: Paul, good presentation.
10 I'm contemplating what I hope you would see as a
11 friendly amendment, could you go back to your
12 scope slide, the one after the map.

13 MR. CENTOLELLA: This one?

14 MR. VAN WELIE: No, the one -- keep
15 going, that one. So I think -- because I worry
16 about putting the DOE into an awkward position. I
17 think it works better if they're asked to
18 participate in a discussion around emerging
19 regulatory models in the states and in the various
20 forums that are already underway, as Phyllis had
21 mentioned. So, if you were to take that last
22 bullet and rub it in as a sub-bullet under the one

1 above, which is, I think, if they've developed
2 information and tools, people are likely to invite
3 them in, to be part of a discussion in whatever
4 forum is already underway, as opposed to
5 recommending that the DOE sort of go out there and
6 be the orchestrator of these events. I think
7 that's an easier fit for them. At least that's
8 the way I view it.

9 MR. CENTOLELLA: I saw this as having
10 two pieces, one of which I think fits with that,
11 Gordon, which is being part of a more regional or
12 national discussion. The other piece of this that
13 I had in mind, and I'm curious what you would
14 think, is that there will be some state level,
15 maybe even some regional discussions that will
16 just happen, but which would benefit from
17 professional facilitation, and there may be ways
18 that DOE could help fund that facilitation.

19 MR. VAN WELIE: That's possible. I just
20 think the request needs to come from the state,
21 for example. I think it's an awkward dynamic if
22 you set it up in a way where you recommend to the

1 DOE that they ought to go out there and educate
2 people and tell them how to do their business. I
3 think that's the awkward part of it. I think to
4 the extent that somebody -- because you then sort
5 of set up this confrontational dynamic. There are
6 many states, I think, who would think they've got
7 this under control.

8 MR. CENTOLELLA: Yes, for sure.

9 MS. HOFFMAN: I'm pulling this closer to
10 me. I'm following instructions. In general, we
11 only provide technical assistance when the states
12 ask that of us. And, you know, similar to some of
13 the things that the states have asked us, and
14 we've done -- I believe is a good partnership --
15 is like the consumer behavior studies -- looking
16 at different rate models and different designs
17 that the commissions have been thinking about.
18 One of the things that I think we've got to get
19 into, is a process of feedback. We'll look at
20 something. We evaluate the progress, and we get
21 the feedback for the commissions, as they think
22 about the evolving nature of regulatory schemes.

1 MR. COWART: Rich.

2 MR. MEYER: David Meyer, DOE. I think
3 the really sensitive part might be, who tees up
4 the questions that are to be addressed through
5 this facilitated process? I could see DOE
6 supporting a facilitated process, but not getting
7 involved in shaping the questions that are to be
8 addressed.

9 MR. VAN WELIE: David, if you don't
10 mind, that's exactly what I intend to do.

11 MR. SLOAN: Tom Sloan, for the record.
12 Going back to Sonny's question or comment, when
13 Paul and Val and I talked several times early in
14 our discussion, we made it very clear this is to
15 be non-prescriptive. We are not going to be
16 telling commissions what the correct model should
17 be, but rather that because we collectively have
18 on both a larger perspective because we come from
19 different states and different systems and such,
20 and because we're maybe closer to the department
21 in terms of what's on the horizon that we would be
22 suggesting how models can be developed that would

1 take into account micro-grids because Kansas
2 doesn't have a lot of that, California does. So
3 how do we bring together the expertise that's
4 available in this room and in the department to
5 facilitate discussions?

6 MR. GELLINGS: I just wanted to reflect
7 for a moment with us all, an approach that was
8 used some years ago in the Public Utility
9 Regulatory Policy Act of 1978, which didn't have
10 very many teeth, but it basically encouraged
11 states to hold hearings and to investigate a bunch
12 of stuff that we now might call load management.
13 It is out of that the (inaudible) management
14 concept kind of evolved. That was very effective,
15 and it didn't -- I'm not sure the exact words, and
16 some of the commissioners here could remind me,
17 but it really didn't force, but it suggested
18 strongly that these things be looked at. And it
19 was very effective. So I don't know that we have
20 to be quite so shy in organizing ourselves, or
21 encouraging DOE to offer to the states that they
22 ought to be looking at certain attributes that,

1 Paul, you described here nicely in your
2 presentation.

3 MR. COWART: Thank you, Clark. Merwin
4 and then Clair.

5 MR. BROWN: Thank you. Merwin Brown,
6 CIEE. I want to offer up a possible form for that
7 last bullet. This looks like it would be an
8 interesting topic for the joint meeting of NARUC
9 and DOE that meet every year around February or
10 January. And so that may be a diffused way to, or
11 a safe way, to start talking about this subject,
12 and so just a thought. Plant that seed in that
13 particular form.

14 MR. MOELLER: So I'm not troubled by
15 anything that I'm seeing here, but you might think
16 about adding words about what this is not. As you
17 move west from retail choice states, folks might
18 hear in those words, standard market design. So
19 some this is what it is, and this is what it is
20 not might help get this over and actually get
21 worked on, so people don't misinterpret what
22 you're trying to say here.

1 MR. CENTOLELLA: I appreciate the
2 comment, Clair.

3 MR. COWART: Carl, and then Wanda.

4 MR. ZICHELLA: Yeah, just a quick
5 thought. It's not just the states, I think, that
6 are integral parts of this conversation. This has
7 been a buzz, just about everywhere in the
8 industry. The Edison Electric Institute very
9 recently signed an agreement with NRDC to look at
10 new business models around distributed generation,
11 and I think that that's a hopeful sign in having
12 the utilities directly sort of controlling part of
13 the conversation about where they think they ought
14 to go would be useful. Along those lines,
15 American's power plan, which wasn't on your map,
16 but I think if it came from the Energy Foundation,
17 they probably would have wanted it to be.

18 MR. CENTOLELLA: Yeah.

19 MR. ZICHELLA: There was a paper in
20 there about utility business models that
21 interviewed a number of utility executives. I
22 forget the exact number, around the country, but

1 looking at their attitudes toward it. I thought
2 that the comment from Merwin about the NARUC
3 meeting and using that as a non-threatening forum
4 that involves both industry and governmental
5 entities was a very good one. You beat me to it,
6 Merwin.

7 MR. COWART: Wanda.

8 MS. REDER: The thing that I think is
9 important to remember -- first of all, I think
10 this is a tremendous piece of work, and I think
11 it's overdue. I think that, you know,
12 understanding the regulatory options and the
13 things that are evolving and getting those best
14 practices out is tremendously important, and I
15 think that's the aim. It's certainly not to be
16 prescriptive, but rather to share best practices,
17 and to kind of open the eyes of work that's going
18 on. The thing that I want to add to the
19 conversation is, I think the premise -- that first
20 slide is really important because it sets the
21 context. The paradigm is changing. And because
22 the paradigm is changing for a lot of different

1 reasons, we can't go forward doing the same thing
2 that we have in the past. And that's really the
3 reason that calls the question on why we need to
4 be looking at different approaches going forward.
5 Not that anything, any set of menus is the right
6 thing for a particular area because those premises
7 are going to vary, depending on the circumstance.
8 I really think this is positioned well.

9 MR. CENTOLELLA: Thank you.

10 MR. COWART: Anything further? What I
11 take from this is that this working group is going
12 to go forward and do a lot of work. There is a
13 ton of material here.

14 MS. REDER: Right, we're looking for
15 support from the EAC to move forward along these
16 lines through the course of 2014. So I gather
17 from the discussion that we have support.

18 MR. CENTOLELLA: Any volunteers who want
19 to help.

20 MR. COWART: All right. Paul, did you
21 want to comment.

22 MR. HUDSON: I just have some questions

1 about the sensitivity of DOE to the very direct
2 discussions with the state regulatory community.
3 I mean it seems to me that the EISA, EPAC,
4 (inaudible) this administration have a very
5 specific set of goals that they haven't been shy
6 about articulating, and I guess I don't understand
7 the sensitivity to that type of very direct
8 discussion, given the very confrontational role
9 that's take by other federal agencies, vis-à-vis,
10 the states.

11 MS. HOFFMAN: So this is Pat. The
12 comment on that is, the federal government may set
13 national goals, but it's up to the states on how
14 they want to implement, and where they want to
15 take state policy. So there's national policy and
16 state policy. But from our perspective, what we
17 do is provide technical assistance to the states
18 upon request in implementing any sort of policy
19 that they look at, whether it be demand response,
20 integration of renewables, rate structures, and so
21 that's been the split or the opportunity of what
22 DOE's role is, and that's how we move forward.

1 MR. COWART: Over a beer, I will tell
2 you about some of the past controversies on this
3 topic, and by the way, I agree with your general
4 observation. I think the states are perfectly
5 capable of ignoring DOE if they want to, and
6 there's nothing wrong with DOE saying to them,
7 hey, we've done some analysis, and we think this
8 is a good idea. And I think if this committee can
9 help DOE in that regard, it's a good thing.
10 Chris.

11 MR. SHELTON: This is Chris Shelton. I
12 basically just want to echo. I was going to say
13 what you said, but you said it a little more
14 eloquently. I feel like we're -- the concern
15 about DOE being prescriptive on policy is actually
16 upside down. I think policy is being prescriptive
17 on analysis, and I think that's a problem. It's
18 inconsistent with the goals. When we did a
19 storage paper, we looked at the goals -- the
20 strategy of the DOE. The type of analysis we're
21 talking about here, is exactly the role of
22 government at the federal level.

1 MR. CURRY: Just to add a footnote to
2 that -- the only way the DOE can be prescriptive,
3 the way I see it, is to say, you can't get any
4 more money from us, unless you do X, Y, or Z.
5 That's how a government agency is prescriptive,
6 unless they've been empowered in some sort of
7 legal fashion to ride herd on the states or the
8 state commissions or whatever. So, as long as
9 we're not, and we certainly don't have the
10 authority, even to recommend attaching strings to
11 DOE grants, I don't think, but I'm willing to
12 offer a legal opinion that we are, just to get it
13 going -- that we ought to take the cudgels --
14 we've been dancing around this for a couple of
15 years. The time has finally come when, and Paul
16 catalyzed this with a lot of work and excellent
17 presentation. The time's finally come where you
18 have to just do something. And if, in its
19 infinite wisdom and goodness, DOE says, well, gee,
20 I really wish you hadn't done that, well then
21 we're not asking for permission, are we? We're
22 asking for forgiveness.

1 MR. COWART: And I would only add to
2 this, in view of the use of the term best
3 practices, one modification to that. I think that
4 one of the things that we have learned, is that
5 innovations precedes, in surprising ways, in a lot
6 of different places. And that it is highly
7 unlikely that we're going to be able to identify
8 practices that we could say definitely are best.
9 We might be able to say, here are some excellent
10 examples, and things that people ought to look at.
11 And I suspect the authors have that in mind. I
12 don't think anybody thinks that the magic is going
13 to come directly to the authors of this paper.
14 But to push things forward at the same time, that
15 we recognize that new things will evolve, that we
16 haven't even thought of yet, that's great. Sonny
17 has a comment.

18 MR. POPOWSKY: Can I just answer your
19 question. I think retail ratemaking is something
20 that is uniquely within the expertise of the
21 states, and that's all I'm saying. Sure, we have
22 policies, and we have tools, and we have metrics,

1 but I don't think we should be recommending that
2 the public utility codes of the 50 states have to
3 be amended in order to make it possible to do the
4 things that we're talking about here. What we're
5 talking about is helping the states think about
6 these issues, not prescribing what they should do.

7 MR. SHELTON: This is Chris, again. I
8 was sort of responding more in the conversation
9 here. I wasn't trying to add a new topic, but I
10 think an example of the type of thing that might
11 be precluded, if we confine our analysis to the
12 existing policy and structures, to borrow an
13 analogy from Telecom is, you know, the design of
14 the internet was something that was done by the
15 federal government. We didn't ask the states to
16 tell us within the confines of how an analysis
17 should be done, to build a communications network
18 that couldn't be brought down. Right, so that a
19 team, funded by the government, designed a system
20 architecture that blew through a gazillion
21 boundaries of policy, right? In the end, that's
22 what it ended up doing, but it was born of that

1 research, and that research wasn't confined to the
2 policies of 50 states. That's the type of thing
3 that I'm talking about, right?

4 MR. CENTOLELLA: I just had to respond
5 to Sonny's last comment, and say, I think there is
6 a tremendous need for capability development
7 within PUC's that what we have today in PUC staff
8 is still largely focused on our historical system
9 of rate making, and our historical model of the
10 way utilities operate. And, you know, that really
11 needs to get expanded, not to say there aren't
12 things from that that will be valuable, but
13 there's a whole new set of issues that many
14 commission staffs are, as of yet, poorly equipped
15 to deal with, and those of us who have been
16 commissioners know, commissioners oftentimes come
17 in and face a huge learning curve, and then they
18 leave the commission and somebody else comes in
19 and has to go through it all over again. So,
20 there's a lot of capability building to be done
21 here.

22 MR. CURRY: Hear, hear.

1 MR. COWART: Wanda. Is there more?

2 MS. REDER: Well, we had one more topic,
3 and in the interest of time, I wondered what you
4 wanted to do. It was the distributive energy
5 storage outline that Merwin was going to raise.

6 MR. COWART: I suspect that we would --
7 well, I'll ask you. What do you think? Do you
8 want to put it off until tomorrow morning?

9 MS. REDER: I don't think it will take
10 very long. We could either put it in the storage
11 committee since it's shared --

12 MR. MASIELLO: I was going to say,
13 there's not much else for the storage committee to
14 talk about, so why don't we do that.

15 MS. REDER: So we could defer it to
16 tomorrow to that part of the agenda.

17 MR. COWART: Is that okay?

18 MR. BROWN: I'm sure I won't get any
19 sleep tonight.

20 MR. COWART: I'm sure it will keep you
21 up, right.

22 MS. REDER: All right, thank you.

1 distribution line. Part of what we're looking at,
2 is potential opportunities for continuing to
3 advance control technologies in the distribution
4 system. Any thoughts in that area or feedback
5 from the committee would be much appreciated,
6 including ideas on transactive opportunities as
7 well. The other area is in the resiliency area,
8 with the emergency operation center, and some of
9 the things that the department is doing with
10 respect to building more capabilities to support
11 emergency response. So I just wanted to give you
12 guys some feedback on that, and number one, say
13 for all the new members, I really appreciate you
14 all joining the committee, and for the old members
15 returning back, I'm glad to see you after all the
16 weather events that kept cancelling the meetings,
17 unfortunately. So it's a huge opportunity -- a
18 lot of things to talk about. I'm really
19 interested in your help in prioritizing some of
20 the discussions in the upcoming meetings, so thank
21 you.

22 MR. COWART: So ten million more in

1 distribution, does that mean that we can have
2 coffee the next time we have a meeting?

3 MR. SUCCAR: Okay, just a few logistical
4 notes. When we adjourn here, the dinner is across
5 the street at Ted's Montana Grill. You can't miss
6 it. We start again tomorrow morning at 8 a.m.
7 Sherie wanted me to mention that the café/deli in
8 the building, opens at 6 a.m. So that is one
9 option that you have before we start up again.
10 And, we will begin tomorrow with Post-Sandy,
11 lessons for grid resilience, and following that
12 with the transmission subcommittee. Any questions
13 on logistics or anything of that nature? Great.

14 MR. COWART: I guess we're adjourning to
15 across the street.

16 (Whereupon, the PROCEEDINGS were
17 adjourned.)

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1 CERTIFICATE OF NOTARY PUBLIC

2 COMMONWEALTH OF VIRGINIA

3 I, Carleton J. Anderson, III, notary
4 public in and for the Commonwealth of Virginia, do
5 hereby certify that the forgoing PROCEEDING was
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7 my direction; that the witnesses were sworn to tell
8 the truth under penalty of perjury; that said
9 transcript is a true record of the testimony given
10 by witnesses; that I am neither counsel for,
11 related to, nor employed by any of the parties to
12 the action in which this proceeding was called;
13 and, furthermore, that I am not a relative or
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15 parties hereto, nor financially or otherwise
16 interested in the outcome of this action.

17

18 (Signature and Seal on File)

19 Notary Public, in and for the Commonwealth of
20 Virginia

21 My Commission Expires: November 30, 2016

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