

UNITED STATES DEPARTMENT OF ENERGY

ELECTRICITY ADVISORY COMMITTEE MEETING

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

2 (9:54 a.m.)

3 CHAIRMAN COWART: As we begin this next  
4 session, I'll announce again that at the  
5 conclusion of our business today, there is a time  
6 for public comments. Are there any members of the  
7 public who have signed up to address the  
8 Committee? I see there are none. I just want to  
9 make sure. We are now ready for our next panel.  
10 And I think the introduction will be done by  
11 Gordon van Welie.

12 MR. VAN WELIE: Good morning, everyone.  
13 Thank you, once again, for joining us. And I  
14 thank a special thank you to our panel, and I'll  
15 tell you a bit more about them in a moment, but we  
16 have a very distinguished panel here with a  
17 diverse set of -- a deliberately diverse set of  
18 perspectives on the issue. So I'll come back to  
19 that in a moment.

20 So, just reflecting on yesterday, I was  
21 thrilled actually, this wasn't coordinated at all,  
22 but to have Commissioner LaFleur sort of recognize

1       some of the issues that we will be discussing on  
2       this panel today. And so I'm paraphrasing, and  
3       I'm just focusing on sort of the market policy to  
4       action aspects of her comments, but she said a few  
5       things that struck a chord with me. The first  
6       was, the point that markets are expanding, and she  
7       talked at some length on that.

8                She also said that the market designs  
9       are obviously different across the country, and  
10      they are all being stress-tested with this rapid  
11      transformation that's happening on the grid. And  
12      she recognized that harmonizing wholesale markets  
13      and public policy objectives are one of the big  
14      challenges facing wholesale markets. And I think,  
15      finally, she also keyed out the question of, how  
16      do we pay for the resources that are needed to  
17      back up weather- dependent renewable resources.  
18      And I think that's one of the key issues at the  
19      heart of this concern.

20               So, the central objective of the panel  
21      today is to provide information to the EAC on the  
22      challenges related to achieving carbon emission

1 reductions in the electricity sector in a way that  
2 is compatible with wholesale electricity markets.  
3 So you may have seen in your materials, I wrote a  
4 memo to the panelists just to give them some  
5 context for this discussion, and I'll briefly  
6 cover some of the main points from that memo just  
7 to, sort of, give us a grounding for this  
8 conversation this morning.

9 I think if you sort of look at this from  
10 the 30,000-foot level, policymakers have  
11 articulate two major public policy goals. The  
12 first is achieving grid reliability through  
13 competitive wholesale markets, and the second is  
14 achieving reductions in carbon emissions, and by  
15 implication, increases in renewable energy. So  
16 this first policy goal led to restructuring of the  
17 electricity industry in approximately two-thirds  
18 of the country.

19 Wholesale markets in these regions have  
20 two primary objectives, to use the principles of  
21 competition transparency and resource neutrality  
22 to select the most efficient set of power

1 resources to achieve reliable service. And the  
2 second objective was to shift the long- term  
3 investment risk in the electricity production  
4 technology away from consumers and towards private  
5 investors in the marketplace. And I think implied  
6 within the understanding that this will allow for  
7 efficient technology renewal, but all of this is  
8 against the backdrop of ensuring grid reliability  
9 is to be maintained.

10 The second policy goal which is the  
11 reduction in carbon emissions has led to state  
12 level carbon reduction targets, and various  
13 mechanisms at the state level, and at the Federal  
14 level to the Clean Power Plan. And of course here  
15 the primary objective is to lower carbon emissions  
16 without affecting reliability.

17 So balancing these policy goals can  
18 raise a range of questions depending on which  
19 wholesale market and regulatory structure is in  
20 place. And as Commissioner LaFleur indicated  
21 yesterday, the design of these markets varies  
22 amongst the regions that have embraced wholesale

1 restructuring. So the memorandum sort of lays out  
2 what the different forms are across the country in  
3 a very summary form. I'm not going to cover all  
4 of that, but I'd recommend you take a look at it,  
5 if you haven't already.

6           So here is the problem. The renewable  
7 resources with low to no fuel costs and out of  
8 market financial incentives, can offer to produce  
9 energy at lower prices than conventional  
10 resources. So as the penetration of these  
11 renewable resources increases, one should expect  
12 that the revenues in the energy market are going  
13 to increase. And if you sort of project this  
14 scenario forward to its logical conclusion, if we  
15 are going to see an 80 percent reduction on carbon  
16 emissions, well, we are going to be producing  
17 electricity from resources that have very low  
18 energy prices.

19           And so the energy market revenues are  
20 going to disappear over time, and the question  
21 that then gets raised is, how does one sort of  
22 sustain the system as a whole? So, in one

1       implication, it's to remain economically viable,  
2       conventional resources will increasingly rely on  
3       the capacity market, or other forms of  
4       out-of-market support, and in the long run any  
5       merchant resource, whether it be a conventional  
6       resource, or even a renewable resource, is going  
7       to end up needing some form of out-of-market  
8       support, or support through the capacity market if  
9       the energy market can't produce the revenue stream  
10      that's necessary in order to recoup the capital  
11      investment.

12                 So the way I look at it I think  
13      policymakers and market designers have a real  
14      challenge here. How do we ensure that carbon  
15      reduction goals and grid reliability achieved and  
16      how we do this, I think it's going to determine  
17      whether wholesale markets continue to be  
18      successful or whether, ultimately, we are going to  
19      be forced to return back to some kind of  
20      cost-of-service model for all resources on the  
21      system.

22                 So with that, sort of a challenging

1 introduction to the panelists, because I know we  
2 are going to have answer to this problem by the  
3 end of panel, and we won't even need to write a  
4 recommendation to the DOE.

5 Let me introduce the panel. We have  
6 four panelists, and they'll speak from left to  
7 right. The first is Bob Ethier, he works at ISO  
8 New England, he is the current VP of Market  
9 Operations, and prior to that was the VP of Market  
10 Development. He holds a B.A. in Economics from  
11 Yale University, and an M.S. and PhD in Applied  
12 Economics from Cornell.

13 Joe Dominguez, who is just to his right,  
14 he is Executive Vice President at Exelon, and he  
15 leads the development and implementation of  
16 Federal State and Regional Government Regulatory  
17 and Public Policy strategies for Exelon which, as  
18 you know, is one of the largest utilities in the  
19 country. He holds an Undergraduate Degree with  
20 honors in Mechanical Engineering from the New  
21 Jersey Institute of Technology, and he is a  
22 graduate of Rutgers University School of Law with

1 high honors. So, an engineer and a lawyer in one  
2 package; so happy to have you, Joe.

3 Rob Gramlich, just to his right, he is a  
4 Senior Vice President with AWEA, the American Wind  
5 Energy Association. He joined AWEA in 2005 and  
6 oversees the organizational research, state  
7 policy, regulatory and public affairs programs.  
8 Rob and I met back in 2001 when he was working  
9 with Pat Wood, so he is somewhat a father of some  
10 of these wholesale markets, so he got the ball  
11 rolling on a lot of this. You can expand on that  
12 later on, Rob. He holds a Master's Degree in  
13 Public Policy from UC Berkeley, and a B.A. with  
14 honors and distinction in Economics from Colby  
15 College.

16 And last we have Beverly Heydinger, who  
17 is the Chair of the Public Utilities Commission  
18 for Minnesota. She was appointed by Governor Mark  
19 Dayton in July 2012. She's a Member of NERUC and  
20 its Committee on electricity, and the Mid America  
21 Regulatory Conference. The Chair of the Executive  
22 Council of the Administrative Law section, of the

1 Minnesota State Bar Association, and a Member of  
2 Minnesota Women Lawyers; she holds a B.A. from  
3 Carlton College and a J.D. from the University of  
4 Michigan Law School.

5 So as you can see, a very distinguished  
6 panel, and with that introduction I'll turn it  
7 over to Bob, to sort of give the perspective from  
8 not only ISO New England, but from an economist's  
9 point of view.

10 MR. ETHIER: Thanks, Gordon. I actually  
11 have some slides. I'm not quite sure how to --  
12 Someone is doing that for me, wow, this is slick.

13 Thanks for the introduction, and since  
14 you brought up where I went to undergrad, I have  
15 to say congratulations to the Yale Basketball  
16 Team, 54 years without a win is a long time, so  
17 we'll take what we can get. It's not often we  
18 have athletic achievements to brag about, that's  
19 for sure.

20 But thanks for the opportunity to be  
21 here this morning, and talk about an issue that's  
22 certainly very important to us in New England. We

1 are really going through the early stages, or  
2 maybe the mid stages, of addressing the issues  
3 that Gordon talked about. How do you keep the  
4 wholesale markets functioning well while  
5 addressing states that have very real and pressing  
6 policy initiatives that they want to implement.

7           So, if we can go to slide 3. Oh. Can I  
8 use this now? There we go. I just had to figure  
9 which of the many buttons it was. So, New England  
10 has had a lot of organic change in its  
11 infrastructure over the last decade or so. Or,  
12 really 15 years, if you look at these slides, the  
13 interesting pieces are the oil as a percentage of  
14 production in New England has fallen from 22  
15 percent to about 2 percent. Coal has fallen from  
16 18 percent to 4 percent, and natural gas has taken  
17 up the slack, they've increased from 15 to 49  
18 percent. So, we've seen a huge shift in New  
19 England away from coal and oil to natural gas,  
20 largely market-driven. But there's been a lot of  
21 turnover in our fleet in that period of time, you  
22 have a lot of -- now you have lots of old, what

1 used to be base-load resources that are really  
2 operated on a few cold days and a few hot days  
3 every year; so, a lot of change there.

4           And what we projected going forward we  
5 are going to see even more retirements. So, we've  
6 seen 3,200 megawatts -- we saw 3,200 megawatts  
7 retire in the 15 years concluding in 2012. We've  
8 already seen 4,200 megawatts retire in the last  
9 three years, with more projected going forward.  
10 So, we are seeing this natural, big turnover in  
11 our markets, and what's important about that is,  
12 what is shows is, at least to me, is that it's  
13 very important that our markets be structured in a  
14 way to reliably incent new resources when we need  
15 them.

16           Today I think the evidence is good, that  
17 is, we have seen a lot of retirements, and we've  
18 actually seen new resources come in based on  
19 market-based pricing, come into the market to meet  
20 our reliability and energy needs over time. So,  
21 you know, these slides demonstrate the need, I  
22 think, for a well-functioning wholesale market,

1 and I think to date we've got that.

2 But we've got new challenges coming  
3 forward. Not only do we have additional  
4 retirements that we expect, and if you sort of  
5 look at the fine print on this, you'll see that we  
6 did a study in 2012, and we looked at likely  
7 retirements and we came up with an 8,300 megawatt  
8 number. That didn't include nuclear units. What  
9 are we seeing now? We've seen two nuclear units  
10 either retire or announce their retirement in the  
11 last couple of years. That wasn't on the drawing  
12 board for us, and at least in part, driven by  
13 market conditions, particularly, well, natural gas  
14 prices.

15 So, not only do we have the retirements  
16 that we sort of expected with these 40- 50-  
17 60-year-old, relatively inefficient units, but  
18 it's also, we have these new market- driven  
19 retirements that we weren't necessarily  
20 anticipating. On top of that, what we have are  
21 aggressive state goals to both increase renewable  
22 energy and simultaneously reduce greenhouse gas

1 emissions. So you can see the states have a  
2 pretty substantial RPS goal, so that they want  
3 large percentages of their electricity generated  
4 by renewable resources by 2020, and they've  
5 already started working on that.

6 We've had a renewable portfolio standard  
7 in New England for a number of years now, and they  
8 also want to reduced their greenhouse gas  
9 emissions as you can see on the right-hand side.  
10 And so these goals are such that when the clean  
11 power plan was announced, the sort of view in New  
12 England, by and large, from what I could tell  
13 among the state folks was, it's about time. It  
14 wasn't; oh, my, goodness, how are we going to  
15 react. We are on track to do this, we may  
16 actually be exceeding these levels, you know,  
17 let's get it done. It's about time other people  
18 got on board with this.

19 So, you know, we, as a region have a lot  
20 of policy-driven change coming our way. And as  
21 operators of the wholesale market, we need to make  
22 sure that the markets work well to accommodate

1       that. For example, you can see the wind. We have  
2       about 800 megawatts of existing wind. This is  
3       name plate, so this is, you know, sort of what you  
4       see when you see the press releases.

5                 We have about 4,200 megawatts proposed,  
6       huge increase when our peak loads these days are  
7       27,000 megawatts, and we are looking at 5,000  
8       megawatts of wind to meet that peak load, for  
9       example. Solar is also growing rapidly despite  
10      the substantial cloud cover that we have in New  
11      England. So we are getting a lot of solar, and  
12      energy efficiency, the states are pouring a lot of  
13      money. The number I hear often is a billion  
14      dollars a year is going into energy efficiency,  
15      largely through the utilities.

16                And it's making a difference. Our load  
17      forecasts have gone from steady upward climbs to  
18      basically flat, when you include all these things.  
19      So there are a lot of -- There's a lot of motion  
20      here in New England, and we need to make sure that  
21      the markets work well, because that's the system  
22      that we, in New England have adopted.

1                   So, what's the problem with that? Well,  
2                   there are inherent problems that just, there are  
3                   some realities. When you add lots of wind, when  
4                   you add lots of solar, and you add lots of energy  
5                   efficiency, it tends to reduce electricity prices,  
6                   and it also reduces margins for the existing  
7                   resources in the electricity market. Yet, I just  
8                   said, we need lots of new resources to come in and  
9                   make up for the retired resources.

10                   How is that going to happen? That's why  
11                   we have a capacity market. What happens when you  
12                   lower the energy market revenues, and the energy  
13                   market margins for resources, is it puts more  
14                   pressure on the capacity market, raises prices in  
15                   the capacity market to levels that are -- that you  
16                   need to incent new resources to come into the  
17                   market. It's critical for us. In our last  
18                   capacity auction, going just last month, we needed  
19                   some new resources, and we got over 1,200  
20                   megawatts of new generation based on market price  
21                   signals. And that is, those are reflecting the  
22                   lower energy market expectations that we see going

1 forward.

2 We have, you know, what Gordon sort of  
3 teed up was this sort of conflict, potentially,  
4 between state policies and running fair and  
5 efficient electricity markets. And I just want to  
6 go into a little more depth on that right now.  
7 So, wholesale electricity markets have actually a  
8 fairly limited objective, which is short and  
9 long-term reliability at basically the most  
10 efficient outcome and at competitive prices.

11 There are some critical market design  
12 elements, these include, clearly defining  
13 reliability services, unambiguous performance  
14 expectations. I think the last time I was here I  
15 talked about performance expectations and how  
16 important it is to have clear rules for  
17 participants and financial consequences if folks  
18 don't like up to those expectations.

19 A key one is appropriate price formation  
20 in all the markets and that's really what the  
21 issue that we are going to talk about today is  
22 appropriate price formation particularly in the

1 capacity market; and then pay-for- performance  
2 which gets the unambiguous performance  
3 expectations. Our belief is that our current  
4 market design should ensure adequate resources to  
5 meet the liability standards, and that the  
6 appropriate -- the resulting resource mix is going  
7 to complement the operational capabilities and  
8 needs that we see when we get these renewables  
9 come into the market.

10 So we don't have a concern, at least at  
11 this point that the new resources that we are  
12 getting aren't going to mesh well with the  
13 renewable resources that we also see being added  
14 to the system. Actually, the new resources we see  
15 come in are pretty flexible, which is what you  
16 need to complement the renewables, so that's not  
17 our concern now. Or probably our biggest concern  
18 is that, what's the consequence if policymakers  
19 seek very specific market outcomes through  
20 out-of-market actions.

21 And that's a problem, because if you  
22 have out-of- market actions taken by the states,

1 for example, that undermine the price formation,  
2 particularly in the capacity market, at least in  
3 New England, you run the risk that you are not  
4 going to be able to get the new resources that you  
5 need to meet your renewable goals. So, the  
6 capacity market will make up for, in our view at  
7 least, and in our experience, will address  
8 deficiencies in energy market revenues, but only  
9 if the capacity market functions well.

10 And how could it not function well?

11 Well, the problem that we are seeing is that  
12 states want to go sign long-term contracts for  
13 large chunks of new capacity, and then have them  
14 come bit into the capacity market at zero.  
15 Unfortunately, the capacity market design is such  
16 that, to get long-term pricing, those that are  
17 going to incent new recourses to enter, you really  
18 need all the new resources to offer at their true  
19 competitive levels, not some level that reflects a  
20 long-term contract and the fact that they actually  
21 don't need those capacity market revenues going  
22 forward.

1                   So that's the tension that we have right  
2                   now in New England. That's not to say that there  
3                   aren't good ways for state policymakers to achieve  
4                   their policy goals, while still allowing the  
5                   competitive markets to work well. We actually  
6                   have lots of good examples in New England already.  
7                   We have SO<sub>2</sub> trading, we have NO<sub>x</sub> trading, and we  
8                   have the regional greenhouse gas initiative. All  
9                   those things are in place for a number of years,  
10                  and they each work well with our current market  
11                  design.

12                  When the SO<sub>2</sub> and NO<sub>x</sub> seasons come and  
13                  go, you can actually see the bidding of the  
14                  resources change on that day, so on a Tuesday they  
15                  won't reflect SO<sub>x</sub> and NO<sub>x</sub> prices, and then on  
16                  Wednesday when the season starts, they'll reflect  
17                  those prices, work seamlessly in our market; RGGI  
18                  is the same way. The generators that are required  
19                  to be a part of -- you know, buy CO<sub>2</sub> credits, they  
20                  do so, it's reflected in their offer. It works  
21                  seamlessly.

22                  So I think we have good examples of

1 environmental policies, implemented in a way that  
2 allows our markets to work well, and thereby  
3 ensure long-term reliability. The problem we have  
4 is emerging actions to meet these policy goals  
5 through things such as long-term contracts with  
6 wind power in the Northern New England states, or  
7 large-scale hydro in New England; the problem that  
8 we are going to run into is that if we -- if these  
9 long-term contracts get signed by new resources,  
10 and then if these new resources want to come into  
11 the market, they are going to depress the market  
12 clearing price in the capacity market, and  
13 undermine the ability of a new entrant to come in,  
14 and meet reliability needs in that market in the  
15 long run.

16           And if the states go down a path of  
17 wanting to do so over the long term, it really  
18 puts the viability of our current capacity market  
19 construct into doubt. We might have to come up  
20 with a new approach to doing that. You know, we  
21 do have a rule in place, and I won't get into the  
22 gory details, but it's called the minimum offer

1 price rule, it's intended to address long-term  
2 contracts. On one level, the rule is effective as  
3 written in that it will prevent the capacity  
4 market prices from being distorted by long-term  
5 contracts for new resources that cause them to bid  
6 below competitive levels.

7 But the reality of it is actually much  
8 more complicated. It's kind of difficult and  
9 complex to implement, and probably even more  
10 important, it creates a lot of frictions with the  
11 states when you tell them that their shiny, new  
12 wind power up in Maine is not allowed participate  
13 in one of our markets because it didn't follow the  
14 rules that we've set up to sort of address those  
15 sorts of issues.

16 So, I think it's a real question whether  
17 the MOPR is going to be a long-term construct that  
18 is successful ensuring the viability of our  
19 capacity market, both because we are getting  
20 pressure from within New England, over the MOPR,  
21 and also because it's currently in the courts.  
22 There's a very similar case in Maryland, and PJM

1       that's addressing this issue, and that courts  
2       could well invalidate this rule and say, no, go  
3       back to the drawing board.

4               So, that's sort of the issue I wanted to  
5       tee up, and how I wanted to leave it with you all,  
6       and I know my fellow panelists have some views on  
7       this, and they may not be quite in accord with  
8       mine, so it should be a fun discussion. Thank  
9       you.

10              MR. VAN WELIE: Joe?

11              MR. DOMINGUEZ: Thanks, Gordon. Good  
12       morning everyone. Gordon's intro reminds me that  
13       I left a once-promising career as an engineer,  
14       and an equally promising career as a lawyer, to  
15       find myself in this morning's predicament. So,  
16       thank you for that, Gordon.

17              This has been teed up so well that I'm  
18       going to -- I'm just going to bucket my comments,  
19       and then let's kind of move to the questions or to  
20       the other panelists, and then to the questions  
21       quickly.

22              First of all, as Bob said, there's no

1       inherent conflict between environmental objectives  
2       and wholesale markets, obviously when the cost is  
3       internalized and the polluter pays, those costs  
4       get reflected in the market and we see that every  
5       day with SO<sub>2</sub> allowances, NO<sub>x</sub> allowances, carbon  
6       allowances that get easily priced into energy  
7       price formation and the wholesale markets. When  
8       we talk about fixed capitalized units whether they  
9       be scrubbers or cooling towers or whatever, those  
10      things could be priced and priced into the  
11      capacity markets.

12                 So the nature of the problem here, if we  
13      could just draw some boundaries around it, is  
14      really in the arena of policies that don't have  
15      the polluter pay, but rather reward attributes for  
16      clean generation prepayments outside of the  
17      markets, so that's the conflict. In terms of the  
18      problem it creates, I'm going to speak from a --  
19      particularly from a nuclear technology  
20      perspective. Bob already talked about a couple  
21      plants, announcing the retirement, New England,  
22      Chairman Zibelman is confronting the same

1 situation in New York.

2 In NYISO we've had this situation with  
3 Duane Arnold, and we are  
4 certainly seeing this issue around PJM. And the  
5 challenges for the nuclear operators are really  
6 three-fold. We have very low gas prices that are  
7 driving very low power prices. Quite obviously  
8 that's probably the most significant effect. We  
9 have some out-of-market incentives, along the  
10 lines that Bob talked about, that are creating  
11 distortions in the energy market, that's a very  
12 important market for nuclear operators, that's  
13 where they receive about 90 percent of the needed  
14 revenues.

15 And so when you see distortions in those  
16 markets they have a particular effect on nuclear  
17 resources that don't have the same effect on  
18 resources that dispatch around these lower price  
19 or in the case of our Midwest units, persistent  
20 negative price events. And I think the FERC  
21 recently approved, allowing negative prices to  
22 fall to negative 160 hours or --

1                   SPEAKER: 150, yeah.

2                   MR. DOMINGUEZ: Negative \$150 in New  
3           England, so obviously that reeks havoc, for a  
4           nuclear power plant that is paying \$150 per  
5           megawatt hour to put power on the system. And the  
6           third problem is that as we've developed these  
7           criteria for those resources that we are going to  
8           give out- of-market support, as a general matter  
9           we have left nuclear out of that equation. Under  
10          the impression, I think it was an accurate  
11          impression for a long time, that nuclear simply  
12          didn't need it, and the reality is, as we are  
13          saying right now, that nuclear, in fact, does need  
14          it.

15                   So, having defined the problem that way,  
16          I think the effect we are seeing, and I think Rob  
17          is right, we are doing some things in the capacity  
18          market, in different places. We don't have a  
19          capacity market in ERCOT, in California, not the  
20          same type of capacity market, certainly in MISO,  
21          but in those states that do rely on a capacity  
22          market for resource adequacy, we are seeing some

1 problems, and those problems have been addressed  
2 through some capacity performance reforms that  
3 we've heard about, but those aren't really  
4 long-term solutions.

5           So, teeing up, Gordon, where I think you  
6 are going in your questions, and you've all read  
7 the memo, I think we can kind of try to think  
8 about this in three different ways. If we want to  
9 have functioning wholesale markets, then  
10 eventually we need to migrate to putting the price  
11 of pollution in that market. And in the case of  
12 CO2, what we are talking about is putting a price  
13 on carbon. That's been a very difficult thing,  
14 obviously, to accomplish legislatively, but  
15 something we very much have to have in our mind,  
16 as we thinking about clean power plant compliance,  
17 because EPA has given the states a couple of  
18 different options.

19           One is a mass-based approach, where  
20 cooperation between states, along the lines we see  
21 in New York and the other RGGI states could work  
22 those things that are consistent with the market

1 as Bob said. We could try to mitigate the  
2 payments; that's the other option here, and Bob  
3 talked about the MOPR, and I think we've gotten  
4 ourselves into thinking that mitigation should  
5 always apply in the capacity market, irrespective  
6 of whether the impact of the out-of-market payment  
7 is principally felt in that market or on the  
8 energy side.

9           And I wanted to tease out for you today,  
10 and perhaps open your minds to thinking about, is  
11 that it is not a natural thing to mitigate  
12 payments that are essentially variable adders in  
13 the capacity market. Remember we have, in those  
14 states that have the capacity market, we have a  
15 functioning energy market, and there we are  
16 bidding in all variable costs of making  
17 electricity. The variable fuel costs, the  
18 variable O&M costs, and then we have capacity  
19 market that deals with the fixed capital costs of  
20 operating the plant. Those costs that don't  
21 change based on the output of the plant.

22           When we are talking about out-of-market

1       adders, whether they are RPS payments, whether  
2       they are production tax credits, or whether or not  
3       the types of things we are talking about in New  
4       York for nuclear. They are essentially payments  
5       that are adders to the energy market. So if  
6       mitigation is going to occur, it's not clear that  
7       that mitigation, through a Minimum Offer Price  
8       Rule in the capacity market, makes the most sense.  
9       Perhaps where that mitigation needs to occur, is  
10      in the bids in the energy market. And if you  
11      think about this from the perspective of all the  
12      RTOs across the country -- ERCOT, California where  
13      you are really seeing the manifestation of these  
14      issues, do not have capacity markets, and where  
15      you really need to think, if you are going to go  
16      down the road of mitigation, is whether we are  
17      going to start mitigating energy bids so we don't  
18      have negative prices, negative \$150 prices simply  
19      driven because somebody is going to get a subsidy  
20      for producing electricity at that time, or an  
21      out-of-market payment for an attribute.

22                   So, mitigation is a complicated issue,

1 we tend to think about it only in the capacity  
2 market design, I'm suggesting this morning that  
3 that's a blunt object or a blunt instrument for  
4 this particular problem if we are going to go down  
5 that road.

6 The third way we could start thinking  
7 about this is to simply recognize that we are  
8 going to have a hybrid. Where states are going to  
9 be focused on a number of resources that are going  
10 to be important to the states, and the balance of  
11 the market could address those resources that lie  
12 outside of the zero carbon or clean energy realm.  
13 So, it is entirely appropriate, I think, to start  
14 thinking about this as a market where we could  
15 start bifurcating the wholesale market or the  
16 capacity markets, into a market that deals with  
17 capacity resources, that are emitting resources,  
18 and capacity resources that are not emitting  
19 resources. And we have two markets that are clear  
20 together, but you clear their clean energy part of  
21 that first, and we've done that.

22 In capacity markets we've tiered things

1       like demand response, and other things, so that's  
2       certainly one approach here, and I think we are  
3       going to, you know, eventually tumble into an area  
4       where most all of the zero carbon resources in the  
5       market, and I'm going to suggest to you today,  
6       that in the fullness of time, that's going to  
7       include nuclear, are going to count on  
8       out-of-market support, and what the wholesale  
9       market may end up doing is being a residual market  
10      for gas fire generation in the fullness of time,  
11      and obviously we are going to have, as we evolve  
12      out of coal, we are not building more coal, so I'm  
13      talking about gas fire generation, as that part of  
14      the resource mix that is going to be dealt with  
15      through these wholesale markets.

16                   MR. GRAMLICH:  Okay.  Good morning.  
17      Again, Rob Gramlich with American Wind Energy  
18      Association, and it was enjoyable to work with  
19      Gordon and Bob in the market design days of RTO  
20      and ISO development in standard market design, and  
21      thought they did a great job in their market, but  
22      the markets are changing, and so we do need to

1 focus on the new challenges, and I am -- we are  
2 diving right into this discussion, so I'm actually  
3 -- (inaudible) speakers do this, I'm not going to  
4 do the slides.

5           If you want to see them, there are some  
6 updates on sort wind and integration into the  
7 grid, and I'll just give three facts and move on  
8 right into the questions here. A couple of  
9 things, wind cost have fallen by about two-thirds  
10 in the last six years. We are at 75 gigawatts of  
11 wind around the country. We were at about four  
12 when I started in this 11 years ago, so obviously  
13 dramatic growth where it -- on an annual basis we  
14 have exceeded 30 percent of Iowa's electricity,  
15 and we are nearing that in some other states.

16           So, in terms of just sort of the simple,  
17 you know, can we do this reliably, clearly some  
18 areas are doing it, both in the U.S. and abroad,  
19 and we can, you know, talk about how exactly  
20 that's done when we have more time to focus on  
21 that. So, let me focus on the questions Gordon  
22 teed up, and that Bob and Joe got to.

1                   It strikes me that New England is a  
2                   region with a lot of retail competition and a  
3                   capacity planning issue. And that capacity  
4                   planning and retail competition have been a  
5                   challenge from the get-go; and I was honored to  
6                   serve on this Electricity Advisory Committee in the  
7                   mid-2000s, and that exact issue was what we or Pat  
8                   and Rich, and others may remember, in that, you  
9                   know, 10 or more years ago.

10                   This is what we are talking about, how  
11                   do we do, and at that time it was pre-2008 market  
12                   dive, so there were expectations of, you know,  
13                   need for rapid capacity expansion, and how the  
14                   heck are we going to do it. Capacity remarks,  
15                   retail competition. So that problem still exists,  
16                   and I don't think anything about renewables or  
17                   carbon reductions, makes that any harder or  
18                   easier, it's just a challenge, and honestly I  
19                   haven't been following it that much recently,  
20                   because it's sort of not our issue.

21                   And I also don't think that the heads of  
22                   the New York, MISO, ERCOT, California SPP, or the

1 other ISOs have quite the same issues. We'll,  
2 hear from Chair Heydinger about what's happening  
3 in the Midwest, but in some regions where you have  
4 vertically-integrated utilities, with a PUC that  
5 oversees capacity planning, they do capacity  
6 planning, that way that's how they do it, and  
7 whether MISO develops or doesn't develop a  
8 capacity market as sort of a residual for trading,  
9 you know, that's fine, that's up to the region.

10 ERCOT does it differently, they do it  
11 with a high energy price, and they have, you know,  
12 maybe that's -- maybe it's time again, I don't  
13 even want necessarily suggest the solution,  
14 because I haven't been focused on this, but there  
15 are other areas that don't have -- you know, rely  
16 on centralized capacity markets with a lot of  
17 retail competition. You know, just a different  
18 issue.

19 So I understand you have a challenge  
20 there, but I think it's somewhat unique to the  
21 region, and it's not exacerbated by renewable  
22 energy. There are issues across the country with

1 low wholesale prices affecting generation, and  
2 nobody is, you know, more conscious of that, than  
3 Joe and Exelon but, you know, everybody, all of  
4 us, every supply side source is dealing with the  
5 fracking, the shale gas revolution, and low gas  
6 prices affect all sources of supply and that's,  
7 you know, an issue for the economics of all  
8 sources.

9           If you look at the market monitor and  
10 reports for New England, it's almost perfect  
11 correlation between gas prices and power market  
12 prices, which the monitor says is a great  
13 indication of how competitive the market is. I  
14 mean that's what's happened. The prices are based  
15 on natural gas, wind and renewables aren't setting  
16 the price, and so again, that's the -- you know,  
17 that's a sort of separate issued, unrelated to  
18 renewables.

19           On the question of whether markets need  
20 to be altered in any kind of fundamental way to  
21 deal with the new twin challenges of, you know,  
22 competition and carbon reductions, I would say no,

1       you know, in my personal opinion. I think the  
2       markets are fairly robust in their design, you'll  
3       want to adequately compensate capacity, energy and  
4       flexibility or, say, ancillary services, and there  
5       has been a continuing need to address those, and I  
6       think every RTO market, you know, has an annual  
7       marketing monitoring assessment, and sometimes  
8       they say, hey, wait a minute.

9               As with New England, I think the recent  
10       report say, short-term flexibility, the ramp is  
11       not being adequately compensated, so we need to  
12       alter the market design, or create a better market  
13       that rewards ramp, fast ramping. And see Mark  
14       with a -- there have been a lot of comments from  
15       NERC about, hey, we have some important  
16       reliability needs, somebody should pay for it, and  
17       it's not NERC's role to say you should pay for it  
18       through markets or some other way.

19               But it should be compensated. We  
20       totally agree with the frequency response. You  
21       know, our preference for all these things, as real  
22       would be as through a market, the markets do work.

1       They are the most efficient way to procure these  
2       services on a competitive and fair and open basis,  
3       and so we can say that but, you know, NERC would  
4       say, get the services, and I think the RTOs would  
5       say, you know, we need the services, and we want  
6       to procure them competitively, so let's develop  
7       the markets.

8                   I think there are issues with the  
9       capacity market design to make sure adequate  
10      capacity is being paid for. I think you are  
11      probably right that over the long term with carbon  
12      reduction policies, there would be potentially  
13      more reliance on capacity markets relative to  
14      energy markets. There is some of that in Germany,  
15      I think, and that may be fine. I mean, if you  
16      have a whole lot of low, variable cost resources  
17      coming into a market, power prices may be lower  
18      over the long term, and capacity prices might be,  
19      you know, if you are -- say, you are gas combined  
20      cycle, and you want to provide the capacity and  
21      flexibility, you might rely relatively more on  
22      capacity and ancillary service market prices.

1                   And that may be fine, that may be the  
2                   efficient outcome. So I think that's okay, and I  
3                   can understand capacity markets are hard for  
4                   everybody to deal with. And I don't envy your  
5                   job, Gordon, going to states and talking about why  
6                   these capacity markets -- Everybody hates capacity  
7                   markets. You know, it's a public good,  
8                   reliability is a public good, and everybody wants  
9                   somebody else to pay for it, that's just the  
10                  reality with public goods, and infrastructure. And  
11                  if you ride the DC Metro, you are facing that  
12                  every day these days. Everybody wants -- I'm in  
13                  Maryland, I want Virginia to pay for that improved  
14                  system. You know, so that's just the issue with  
15                  capacity markets. We are not going to get away  
16                  from that.

17                  And final point, long-term contracts, I  
18                  think, we don't want to throw the baby out with  
19                  the bathwater. Long-term contracts are efficient  
20                  for suppliers and for consumers. And I'm looking  
21                  at Roy here, because this was something that we  
22                  always understand the market design RTOs. We in

1 Pat Wood's office always said, yeah, you should do  
2 long-term, short-term, mid-term, you should have  
3 free choice, consumer choice of what types of  
4 contracts you want to do, and the RTOs should be  
5 designed compatible with that, and it didn't  
6 always work in the Northeast that well, and so  
7 it's a continuing issue.

8 But long-term contracts, particularly  
9 for renewables, because they are 100 percent  
10 capital, zero percent variable cost, the weighted  
11 average cost to capital is a huge deal on the  
12 end-use consumer price. If we want to get low  
13 carbon or zero carbon resources to consumers, on a  
14 cost-effective basis as a nation, we've got to be  
15 looking at long-term contracts, because that  
16 weighted average cost of capital will massively  
17 reduce the cost to consumers. So, we need to  
18 preserve a market and allow somebody to plan, and  
19 then that gets back-to-back the -- now we are in  
20 this kind of do loop here.

21 Well, okay, if you are in a retail  
22 access area, you know, the load serving entity

1 doesn't know who they are serving, 3, 5, 10 years  
2 out, so they don't -- So are you placing the  
3 obligation on them, or who are you putting the  
4 obligation on? So it gets back to his,  
5 fundamentally it's about retail competition and  
6 capacity planning. And again, smarter minds than  
7 mine need to worry about that, but that's not a  
8 renewable specific, or a carbon reduction issue.  
9 So I'll leave it there, and looking forward to our  
10 Chairman, actually doing some of the stuff in the  
11 Midwest.

12 CHAIR HEYDINGER: Thank you. As  
13 introduced, I'm Beverly Heydinger, and I'm Chair  
14 of the Minnesota Public Utilities Commission, and  
15 I'd like to give a special shout out to my  
16 colleagues here; Commissioner Roberti and  
17 Commissioner Zibelman, nice to see you. Very nice  
18 to be invited and, you know, I am the alien from  
19 the alternative universe here.

20 I think my whole perspective is quite  
21 different. First, because I'm not an expert on  
22 the markets, and as a missionary in a vertically

1 integrated state, we are very much aware of, and  
2 participants in MISO, and among the organization  
3 of MISO states, play a role in helping shape the  
4 policies there, but we have several distinguishing  
5 features, I think. And part of the way I look at  
6 it is that the wholesale market, when you are  
7 coming from a vertically integrated state, is  
8 really there to serve the expansion of open  
9 markets, and to look at how those vertically  
10 integrated states can work even better within that  
11 construct rather than starting with an open  
12 market, and then figuring out how can the states  
13 work better -- do their job better within that  
14 starting point.

15           So, it's as if you are really starting  
16 in two different places, but over time, I think  
17 what we can see is that we are getting to  
18 adjustments coming from those two directions that  
19 lead us in many ways to similar, different but  
20 similar results. And, so just to step back again  
21 to say, that in a state like Minnesota, I guess  
22 you could say we are unusual in a lot of respects.

1                   We do have a very robust integrated  
2                   research planning process, all of our  
3                   investor-owned utilities have now for many years,  
4                   come to the Commission every two to three years  
5                   with their 15-year plans for how they are going to  
6                   -- what they anticipate their load will be, and  
7                   what the resources are that they are going to have  
8                   to meet them. At the same time, Minnesota has had  
9                   very aggressive renewable portfolio standards,  
10                  greenhouse gas reduction standards, aggressive  
11                  energy efficiency standards, but again, we are not  
12                  at -- you know, this is very Midwestern. We are  
13                  not at the lead here, but we are at the top of the  
14                  pack I guess you could say.

15                  So, all of that has factored into our  
16                  integrated resource planning over a number of  
17                  years, particularly since 2007 when, our New  
18                  Generation Energy Act came into place. So,  
19                  because we work with our utilities at that level  
20                  of resource planning, they have had the  
21                  opportunity over time to plan for this transition,  
22                  and to provide some of the certainty, I think,



1 look at peaks and coincident peaks and so forth,  
2 peaks in -- the coincident peaks for our utilities  
3 are not necessarily those of the MISO region which  
4 are at a different time, that can allow us savings  
5 for planning for those peaks as well. Lower-cost  
6 unit commitments and dispatch to handle  
7 congestion, and another key component, I think,  
8 which distinguishes Minnesota in some ways, is  
9 that we are a net energy importer.

10 So, again, out utilities, as generators  
11 and power purchasers, don't necessarily have  
12 access to resources that they must sell into a  
13 market in order to assure that their costs are  
14 met. We are able to provide -- I don't want to  
15 say -- We don't provide financial incentives, per  
16 se, to add renewable resources into the mix of our  
17 investor-owned utilities, but by virtue of setting  
18 rates which include capital costs, and reviewing  
19 the prudence and reasonableness of those capital  
20 costs they do, again, have some assurance, that  
21 their longer-term investment costs are going to be  
22 met.

1                   Again, too, within my MISO there are 23  
2           balancing authorities, and I think that two  
3           (inaudible) state like Minnesota to assure that  
4           reliability and that planning, and that lower  
5           cost, there are ways to hedge against congestion  
6           in the system is necessary, and all of those are  
7           benefits that we have of participating in MISO.

8                   How that then affects? Let's take  
9           nuclear, we have two large nuclear units in  
10          Minnesota, and because their capacity costs are  
11          essentially built into rates, they can afford to  
12          be price-takers in the MISO market, and if the  
13          load expectations are low, they can bid in a range  
14          of their capacity that's available to produce  
15          energy, the available energy that's available.  
16          And set the price to take at the lowest otherwise  
17          set cost within that MISO market.

18                   And then they are available to continue  
19          to provide that energy as the load increases --  
20          rise. So, similarly that is true for the wind,  
21          and particular in Minnesota, and as you may know,  
22          our solar is still in infinitesimal, growing. But

1 wind is a big player, and it's so cost-effective  
2 from an energy point of view, that our utilities  
3 are going out and purchasing more wind in order  
4 to, again, offer it at that lower cost, but it  
5 helps take away some of their additional marginal  
6 cost of running more expensive natural gas, or  
7 coal, above the minimum that they are required to  
8 operate.

9           The other pieces of the markets that are  
10 very important to use, are the auxiliary service  
11 markets, because it's true that all the players in  
12 the MISO markets are bearing a portion of the cost  
13 for those reserves, both those that must be  
14 instantaneous, and those that can be called on us,  
15 like the longer timeframe.

16           But that socialization, I guess you  
17 would say, of all of those costs can keep the cost  
18 for the Minnesota rate pairs relatively low to  
19 have that assurance, that reliability and that  
20 reserve, if you will, to buttress the overall  
21 system. So I think there is very much a role for  
22 the market, even within the vertically-integrated

1 states, but I do think as we go forward, and we  
2 look at decreasing carbon, and increasing reliance  
3 on renewable resources, in some respects the model  
4 of having vertically integrated resources works  
5 very well for us. Now, I don't want to speak for  
6 our investor-owned utilities, but I think the  
7 certainty for them, has allowed them to do some  
8 pretty robust planning.

9           Do we have challenges? Absolutely!  
10 Demand response, for example, in Minnesota we have  
11 not permitted third-party aggregators to work in  
12 that market, and instead we require our utilities  
13 to take it into account in their planning and we  
14 push them to look at how they can use that as a  
15 way to avoid future new generation. But going  
16 forward, will we be looking at whether that's a  
17 marketable product that may be more valuable to  
18 us, I think that we will.

19           We also have some difficulties in  
20 vertically- integrated states because our  
21 utilities serve more -- serve our customers in  
22 more than one state. And the policies across

1 state lines don't align very well. I don't think  
2 it's any big mystery that North Dakota and  
3 Minnesota don't see the world through the same  
4 eyes. And North Dakota's 51st in its energy  
5 efficiency policies, so their customers in North  
6 Dakota are definitely benefitting from the energy  
7 efficiency policies that Minnesota has set for  
8 Excel in particular, which has by far its largest  
9 load in Minnesota, but leaks over into North  
10 Dakota, South Dakota, Iowa and Wisconsin.

11 On the other hand, they look at other  
12 pieces of the energy policy in Minnesota that they  
13 believe are costing them money, solar in  
14 particular and they don't want to pay for it. So,  
15 there definitely are challenges when you are  
16 attempting to balance the policies of the various  
17 states. In some respects, I think MISO handles  
18 that very well, because the utilities can,  
19 essentially, self-schedule and can offer their  
20 resources in as price takers in order to meet the  
21 states' goals.

22 And because MISO does a good job of

1 looking ahead and asking the utilities to give  
2 them a one-year look ahead on which generation is  
3 going to be in the system, which generation is  
4 going to be retired, they have a pretty good idea,  
5 footprint wide of whether there's sufficient  
6 resources to meet reliability standards. Right  
7 now MISO is quite long actually. Could that  
8 change? And as they were looking ahead to  
9 implementation of the Clean Power Plan, obviously  
10 there were some red flags going up.

11 But, in general, because of the very  
12 cost- effective wind and our ability to integrate  
13 it across a wide and large footprint, I think it's  
14 about 1,000 miles, maybe 800 miles, I think,  
15 allows for a lot of variation in whether excellent  
16 weather forecasting interestingly that I think has  
17 developed as a result of that MISO footprint, that  
18 can allow for then the anticipation of whether  
19 other resources like natural gas or nuclear are  
20 going to ramp up in those states when wind is not  
21 blowing.

22 So, that's the view. You know, I'm not

1 a market expert, fortunately I don't have to worry  
2 a great deal. We have people at the Commission  
3 who follow MISO carefully and participate in the  
4 OMS stakeholder group, but as we do meet with MISO  
5 on a quarterly basis, they come in and talk to us  
6 about questions that we may have, or topics they  
7 want to address to us, and it seems to be a  
8 relatively -- how shall I say -- strong  
9 relationship that is working well at this point.

10 And within MISO I believe about 90  
11 percent of the load is served by  
12 vertically-integrated states. So, again, that is  
13 the model if you will, that largely dictates how  
14 the market operates within MISO. So, I hope  
15 that's helpful; a little different perspective.  
16 Welcome to answering your questions.

17 MR. VAN WELIE: Thank you very much. I  
18 have a whole series of questions, but I don't want  
19 to dominate this. I'd like to open it up to the  
20 floor, and let everybody else have an opportunity,  
21 and if that's okay with you Rich? I'll save my  
22 questions if there's time at the end.

1                   CHAIRMAN COWART: All right. Well,  
2 we'll hear from John, and then Paul.

3                   MR. ADAMS: Well, I wanted to ask, you  
4 know, I heard one statement made that the  
5 renewables were not an issue and that they didn't  
6 set the price, and I just want to comment in  
7 ERCOT, yeah, they do set price and it is negative.  
8 Joe, I'd like to thank you, I've never considered  
9 a residual market separate from the other  
10 resources. I'd always thought there were three  
11 solutions to this, in an energy-only market, which  
12 is really the only one I had experience with. One  
13 was extremely high scarcity prices. The second  
14 one was ancillary services.

15                   Essentially pick up that cost, and the  
16 third is what we don't have, a capacity market.  
17 So you've introduced a fourth, but what I didn't  
18 hear is price formation for the first of those.  
19 Okay, so you've got residual market for fossil  
20 only, was what I understood that to be, but you  
21 said nothing about the pricing for the zero  
22 marginal cost units, is what I'm thinking of these

1 as. Do you have any comments on that?

2 MR. DOMINGUEZ: Yes. And I guess what I  
3 really think is going to occur is that that is not  
4 going to be a market price in the traditional  
5 sense, that it's set by the wholesale market.  
6 That we are going to bundle up these  
7 externalities, we are going to make decisions that  
8 we want these resources to exist, and essentially,  
9 that is what we have been doing at a federal and  
10 state level, with the mandates that already are in  
11 place.

12 And so my view is, and it was  
13 interesting hearing the Chair's comments,  
14 especially, and particularly one comment about  
15 North Dakota, but now I think that that is a  
16 little bit of the model as we trend back in the  
17 market world to something where the states  
18 actually do have some significant domain over zero  
19 carbon resources, renewables, hydro, and nuclear,  
20 and the balance of the market where price  
21 formation is going to be important is in the  
22 fossil side.

1                   And I think the payments to the zero  
2                   carbon resources are really going to be based on  
3                   their externalities and a desire to have them,  
4                   rather than their relative competitiveness with  
5                   fossil fire generation.

6                   MR. ADAMS:  Anyone else wants to comment  
7                   on that?

8                   CHAIRMAN COWART:  Paul?

9                   MR. ROBERTI:  Great panel.  And I wanted  
10                  to ask Bob a question about the construct of  
11                  capacity markets, given what Rob said, and I  
12                  thought he eloquently stated about the role of  
13                  long-term contracts, that state regulators like  
14                  myself, and others are typically approving in  
15                  order to provide the best value to consumers.  And  
16                  I know in the capacity market in New England, we  
17                  move from a commitment period that you could get  
18                  revenues from, I think, five years to now seven  
19                  years, and given what Rob said, and the way we've  
20                  continued to refine capacity markets.

21                  I'm just wondering if you had views on  
22                  whether the construct should reflect the financial

1 instruments that are actually prevalent in the  
2 marketplace, and perhaps have longer lock-in  
3 periods for receiving capacity revenues, if the  
4 marketplace really needs 20-year agreements, and I  
5 don't think anything has changed recently on that,  
6 in order to incentivize clean energy resources,  
7 what's your view on, you know, we've gone from 5  
8 to 7, why not 10, or maybe 20, as a product in  
9 that market to represent what's actually going on?

10 MR. ETHIER: Boy, you really give me a  
11 tough one, Commissioner. That's exactly the sort  
12 of discussion we've been having internally about,  
13 if the states continue to design where does our  
14 capacity market go from there; because if the  
15 states want to continue to do that, the MOPR is  
16 probably going to become untenable for some  
17 reason, right. There's going to be so much  
18 political pressure on it, that it's not certain,  
19 at least, that we could continue to do what we do  
20 and keep those sorts of contracts, and resources  
21 associated with the out-of-market.

22 So what do you do then? Certainly one

1 option is, all resources get longer-term  
2 contracts, that's a very different design than we  
3 have today, at least on the auction side. I think  
4 a lot of the performance characteristics that we  
5 have in place could still work, and actually are  
6 still the right way to incent, you know, sort of  
7 real-time performance, but you'll have a very  
8 different construct, if you said, okay, we are  
9 going to get all new resources into the market  
10 with 20-year deals.

11           You could do that, but then what do you  
12 pay the existing resources? That's sort of where  
13 it gets difficult. You could say that the  
14 existing resources get what the capacity market  
15 pays them, which is going to be some de minimis  
16 amount, because the new resources would no longer  
17 be setting a competitive price. And I supposed  
18 you could get away with doing that once, but never  
19 again would you get a merchant entrant because  
20 they would see that all their expectations of  
21 competitive market revenues were just undermined  
22 by this new regime.

1                   So, you know, I think if the states want  
2                   to keep going down this path, and as an economist,  
3                   I would rather they didn't. I would rather see  
4                   something like a carbon tax, which I think works  
5                   better for a whole bunch of reasons, and  
6                   accomplishes the same -- you know, get you to the  
7                   same point but through a much broader array of  
8                   cost-effective mechanisms. You know, if the  
9                   states wanted to go down the long-term contracting  
10                  path, one of the implications is that everything  
11                  new is going to have to be through a long-term  
12                  contract, including non-renewable resources, which  
13                  the states haven't been as interested in  
14                  supporting.

15                  So I think it's a much broader  
16                  discussion, and I think it will be a challenging  
17                  discussion just because, you know, there are  
18                  certain elements in New England. Rob sort of  
19                  mentions this, which is retail competition which  
20                  just makes it harder to figure out who is going to  
21                  sign those long-term contracts, and if you want to  
22                  keep retail competition, how do you have long-term

1 contracts? Who signs them? Is it the utilities  
2 and then they allocate the cost out to the retail  
3 players?

4 I don't know. It will require a lot of  
5 coordination amongst the states to make that work  
6 out. So, you know, I'm not saying it's not  
7 possible, but it's a pretty fundamental change to  
8 what we have today, and the states are clearly  
9 going to have to be in close cooperation with us  
10 to figure out what a future path would look like,  
11 because I think our current one would not work.

12 MR. VAN WELIE: Rich, may I just ask a  
13 follow-on question to the one Paul asked, because  
14 I think it's --

15 CHAIRMAN COWART: I think you should do  
16 the follow up whenever it occurs to you.

17 MR. VAN WELIE: Also, I want to make a  
18 linkage here to a discussion we were having  
19 yesterday, which is there's a lot of enthusiasm  
20 around setting up markets at the distribution  
21 level. And it strikes me that, in order to have  
22 functional markets at the distribution level, one

1 of the things one has to be able to do, is value  
2 the incremental provision of the reliability  
3 service. You have to be able to price it somehow.

4 So, I wonder in a world where everything  
5 is contracted or long-term how one does that? And  
6 I'd be curious, as to whether the panel has any  
7 views on that? At the wholesale level signing  
8 everything up with long-term contracts, how does  
9 one reveal the true cost of providing reliability,  
10 so that you can make distribution level markets  
11 work?

12 MR. ETHIER: I have to admit I haven't  
13 put a lot of thought into distribution-level  
14 markets, but it does get -- when you have lots of  
15 long-term contracts you don't get the same  
16 transparent pricing that we currently provide in  
17 our markets, that's for sure. Not that there are,  
18 you know, sort of aggregators, or aggregations or  
19 average prices that you can look at, but it's not  
20 as transparent and it's not as necessarily as  
21 liquid.

22 In terms of the cost distributing out to

1 the retail level, there would be a whole other  
2 level of cost allocation discussion that we would  
3 have to enter into if we had long-term contracts  
4 that were entered into at the wholesale level, and  
5 would have to pass those down to the retail folks.  
6 I think that would be have done by the states, I  
7 don't know how we do that, as MISO.

8 MR. DOMINGUEZ: I think the answer to  
9 your question is you don't -- I mean, if you have  
10 long-term bundled contracts for these resources,  
11 and what you are trying to distill out is some  
12 transparent price for some component of the value  
13 proposition like reliability. I don't know how  
14 you do that in a world where you have long- term,  
15 bundled contracts. I mean that's one of the  
16 reasons we tumble to markets in the first place is  
17 to try to distil out the different components as  
18 we unpack energy, ancillary services and capacity.

19 And so if the notion here is to  
20 repackage all of those things in addition to other  
21 externalities around environmental attributes, and  
22 then say, well, what's the component price you are

1       paying for reliability, I don't think you could do  
2       that from a market standpoint, and it's a market  
3       design standpoint. I think where you probably do  
4       that, is in judgments at the Commission level, in  
5       terms of how they justify the price level for that  
6       long-term contract for distributed resource.

7                   And there, you know, and I think the  
8       route proceeding then gives us a little bit of the  
9       roadmap, one might say that building solar, for  
10      example, on the part of the distribution network  
11      may have the need for other investments in  
12      substations or hard investments. And there I  
13      guess, Gordon, you can make some sort of judgment  
14      that the component value of reliability at that  
15      part of the grid, is worth the eliminated need for  
16      the hard investments, but in terms of the market I  
17      don't see it.

18                   MR. GRAMLICH: You know, there are two  
19      frameworks in the country, one is kind of  
20      vertically integrated traditional planning model,  
21      and the other is the full market model. If you  
22      are in the full market model I think you define

1 the services the system needs and create a market  
2 for each one. And that hasn't changed a lot,  
3 although as I said, there is more need more need  
4 for flexibility so, you know, kind of an hour,  
5 two-hour product and we where you have suppliers  
6 and buyers for that, I think there's a need for  
7 that, and I would roll that down to the  
8 distribution level.

9 I have not thought about it a lot, I  
10 know those in New York are thinking a lot about  
11 it, but it seems like you value, take the services  
12 that are needed by the system and create a market.

13 MR. VAN WELIE: How does it get revealed  
14 though? I mean, that sort of thing that occurs to  
15 me is that once it's -- once the bulk of the  
16 service is bundled in the contracts, there's only  
17 a very small portion of the value that's actually  
18 visible to the marketplace, so how do you actually  
19 get somebody to invest, in supplying that service  
20 just from a merchant point of view, or do you --  
21 or are you forced into saying, I recognize a need  
22 and I'm going to sign another long-term contract

1 with this type of technology to satisfy that need?

2 MR. GRAMLICH: Right. So, if you are  
3 allowing for bilateral contracts as opposed to a  
4 system where everything is part of the pool, and  
5 there's only sort of short-term trading, then I  
6 think you have to assign out the obligation, so  
7 the system needs, you know, X-widgets of  
8 reliability service and, you know, each  
9 load-serving entity have their proportional share,  
10 or however you share it out of that widget  
11 obligation. And then they have to go into the  
12 market and buy their widgets and the suppliers of  
13 widgets sell, and they can sell, and the willing  
14 buyer and seller can sign a 10- 20-year contract  
15 if they so choose; or they can just go to daily  
16 spot market.

17 CHAIR HEYDINGER: And I'm sure  
18 Commissioner Zibelman has thought a lot about  
19 this, but I think as a Commissioner, I also do a  
20 little bit of work around the remaining state  
21 authority over telecommunications. And in some  
22 respects this is the same point as the telephone

1 companies are increasingly deregulated, there's a  
2 big question of, who serves the customers at the  
3 end of the line, where the costs are much more  
4 expensive? And it's essentially the reliability  
5 question as well.

6 How do you create the right, either  
7 obligations or incentives, to assure that those  
8 least cost-effective customers continue to get the  
9 reliability that we've come to depend upon?

10 MR. ROBERTI: Could I just follow up on  
11 that one to complete the circle on this? Given  
12 the panel yesterday, given the retail versus  
13 wholesale dynamic, and what, Gordon, you just  
14 said, I guess the final question to Bob would be,  
15 is an energy-only market like ERCOT really the  
16 preferred way of accomplishing all the goals  
17 rather than the bifurcated approach for the  
18 capacity market? And even a seven-year -- I guess  
19 seven years, was probably just a midpoint to  
20 balance that interest between what states are  
21 doing, and the market principles that you need.

22 MR. ETHIER: That's another debate that

1 we've had many times internally, of energy-only  
2 versus a capacity market. To me, the benefits of  
3 energy-only aren't quite as clear cut, or I don't  
4 necessarily know that they resolved the issue that  
5 you are talking about. You know, as Joe  
6 mentioned, he has some real concerns about energy  
7 market price formation in a world where you have  
8 all these different subsidies coming from  
9 different entities that have these sort of, maybe  
10 unintended consequences in the energy market.

11 So, all of a sudden you are throwing  
12 your lot in with an energy market that's got all  
13 these -- you know, that already has concerns  
14 around it (a); (b) then you have to have scarcity  
15 pricing nets that's radically high compared to  
16 what we, at least, in New England are used to; not  
17 that it's not rational given that you have an  
18 energy market, but you have to be prepared to live  
19 with that.

20 And third, and maybe most problematic is  
21 in New England, you know, we have reliability  
22 standards that are sort of maybe beyond our

1 control. That is, we have certain criteria that  
2 we are obliged to aim at, that we don't have as  
3 much flex about. You know, I'll be certainly  
4 happy to talk about whether those are sensible  
5 reliability standards or not, but that's --  
6 probably shouldn't get into that today.

7           Where, it's my understanding that ERCOT  
8 and the state of Texas have a little more  
9 flexibility about what reliability level they are  
10 comfortable hitting, which seems to me, pretty  
11 important in an energy-only market because, you  
12 know, you are setting these scarcity prices that  
13 are only going to come into play, you know, 15  
14 days, 20 days a year, and you are trying to drive  
15 a 30-year investment off of this one number that  
16 you are setting, or these few numbers that you are  
17 setting. And you don't know how the market is  
18 going to react, because that can be high enough,  
19 it's going to be often enough? Are they going to  
20 meet the reliability standard that you want to  
21 hit?

22           Versus in a capacity market, you know,

1       when we run the capacity market we have a pretty  
2       good idea where we are going to end up on that  
3       reliability curve, and we design our market to  
4       land about where we are going to land. You know,  
5       not that you can't operate it, obviously, and I  
6       applaud ERCOT for trying it, but part of me is  
7       also happy that they are trying it, not us.

8                   MS. ZIBELMAN: Can I follow up with that?

9                   CHAIRMAN COWART: Let me just make a  
10       statement here. There's lots of interesting  
11       conversation here, I'm trying to keep track of  
12       everybody's cards in the order they went up. And  
13       just to give a heads up, I have Audrey and Tim  
14       next, followed by Chris and Sonny, and I'll just  
15       work down the list.

16                   MS. ZIBELMAN: First of all, I think  
17       it's -- I appreciate the panel, and the candor,  
18       and I think it was a -- To me the conversation  
19       that Rob Gramlich set out, which is this, really  
20       ends up, can be a debate that we had in the '90s  
21       around capacity planning, and whether retail  
22       competition can work we can think about these as

1 sort of options and say, we'll, a lot of these  
2 issues could be eliminated if we move to the  
3 California model, and just eliminate retail  
4 competition and put the utilities back in the  
5 planning mode, and allow the markets to be  
6 residual markets.

7 Or, we could think about the ERCOT  
8 model, and say, well, maybe we just rid of the  
9 capacity markets, but I think what I'm disturbed  
10 about is the fact that we have to have the  
11 conversation, I think in a way that absolutely  
12 addresses the hands we are dealt. I mean, it's  
13 nice that we have this debate internally.  
14 Wouldn't it be great to have a carbon tax? Well,  
15 we are not -- We don't have a carbon tax, but we  
16 do have states who have legitimate interests, and  
17 I think the friction we are seeing now, because of  
18 low gas prices, is that in the restructured states  
19 you have states who are not able to serve what I  
20 think everyone would agree, are legitimate state  
21 interests in a way without running into litigation  
22 risks between state and federal rights.

1                   And I think that's -- that's what we  
2                   really sort of need to talk about, is there a way  
3                   that the markets can accommodate the state  
4                   interest? Or, do we have to look at a new  
5                   restructuring, because I don't think those state  
6                   interests are going to go away at any time soon,  
7                   and I know we talked about a couple of them. But,  
8                   you know, let me put this, I would like to, sort  
9                   of the panel, and what I would say is, are we  
10                  wrong in saying these aren't real interests that  
11                  the state should pursue.

12                  I mean, one is resource mix. You know,  
13                  clearly the states have an interest in things like  
14                  carbon, reduced technologies and fuel diversity.  
15                  The polar vortex was not that long ago, that a lot  
16                  of us saw very, very high prices because of an  
17                  over-reliance on one fuel, and we worry about  
18                  reliability, and we worry about fuel diversity, and  
19                  we think about the fact that we are at that point  
20                  in time, low interest rates, low tax rates,  
21                  ability to create renewable infrastructure, and we  
22                  would like to take advantage of it.

1                   Secondly, it's with consumer  
2                   affordability. I mean, we worry about the  
3                   ultimate price to the consumer, so if you have  
4                   things that we know are cheaper, because we know  
5                   long-term contracting reduces financing costs, and  
6                   therefore reduces the cost to the consumer. Can  
7                   we say that the market should be able to  
8                   accommodate that in a fair way? The other is  
9                   allocation of costs. I mean, the states do worry  
10                  about low-income, and seeing how they participate  
11                  in the market, and those issues aren't going to go  
12                  away.

13                  Other questions that are really becoming  
14                  important to us, is public safety. I mean, one of  
15                  the things that is becoming increasingly apparent,  
16                  you know, low gas prices are wonderful. We like  
17                  to maintain diversity, that's why we are having  
18                  this discussion with the nuclear power plants. If  
19                  they were in an integrated state the question that  
20                  Bev would ask is: Are the capital investments  
21                  prudent? And then she would make sure that the  
22                  nuclear plants are being funded even if they are

1 market in MISO, because she will be making a  
2 determination she wants to retain nuclear.

3 I worry that if the markets aren't  
4 giving nuclear owners enough capital, are they  
5 going to be making decisions that are really going  
6 to put public safety at risk, and so how do we, as  
7 a state, supplement what the markets are doing  
8 because we might want to maintain those  
9 carbon-free resources. And then lastly, is  
10 economic support. I mean I think we can't get  
11 away from the fact that we have a lot of  
12 communities across the country are really  
13 depending on generators for a good piece of their  
14 tax revenue, so when these plants retire, and we  
15 are seeing this in New York, where could be very  
16 much affected communities, that becomes a big  
17 issue for the state.

18 So, to me, the issue has got to be, we  
19 can't say: Oh, it's really bad or the states to  
20 pursue the legitimate interests, I think we have  
21 to have these discussions, and that's what I'll go  
22 back to, is maybe, in a low gas market, we really,

1 we need to think too, do we need capacity markets?  
2 Should be saying maybe we should go back to some  
3 sort of local procurement, and allow the markets  
4 to be residual markets because low gas prices are  
5 just changing the nature of the game, and  
6 shouldn't the markets be flexible enough to deal  
7 with the reality of the changed dynamic?

8 As opposed to saying, well, because the  
9 dynamic has changed, we are going to have to  
10 mitigate, and we are going to prevent the states  
11 from going forward. I think that's, in my mind,  
12 where the discussion needs to be taken.

13 CHAIR HEYDINGER: Audrey, thanks very  
14 much. I just want to add, too, that you raised  
15 this point about many other interests that expand  
16 the scope of how our decisions have to be made.  
17 And the one about closing generators in  
18 communities is the big one, and so that in  
19 Minnesota, raises the question of -- we have a few  
20 large coal plants that we are planning for closing  
21 in the 2024 time horizon, which you might say  
22 gives the community plenty of time to plan. And

1 we would typically look at reducing -- replacing  
2 those resources in a way that would meet renewable  
3 energy goals, be cost competitive.

4           And in Minnesota we've often required  
5 the utility even though it's to serve their own  
6 load, to go out for competitive bids, so they may  
7 not be the builder and owner of the resources  
8 going to serve that. So then what happens? Well,  
9 utilities get nervous, and go to the legislature  
10 to say, you know, that's a non-starter. We need  
11 that new generation to be located in the same  
12 community, there are other political and economic  
13 reasons why it should be placed there, and they'll  
14 put us through a competitive resource acquisition.

15           And so I think it's no surprise to  
16 anyone that rational step-by-step planning also  
17 gets bypassed in many ways, both at the state  
18 level and the federal level, frankly. These  
19 aren't perfect worlds in which we operate where we  
20 can put all of our policies in place, and then try  
21 to make decisions that are balancing a variety of  
22 interests. A lot of times we are doing that with

1 one hand tied behind our back, at every level.

2 I'm not suggesting that's unique to Minnesota, or  
3 even just to the state governments.

4 Yes. And that's sort of this final  
5 point I wanted to make. The markets are good  
6 commodity markets, the commodity pricing isn't the  
7 end all and be all of the policy, and that's what  
8 I'm thinking we need to get the markets to sort of  
9 think about how do they do their jobs in this  
10 complexity of issues that we have to deal with on  
11 a policy level.

12 MR. GRAMLICH: And I'll just add  
13 quickly. I think those are exactly the right  
14 questions for each state to consider. I think  
15 they are all legitimate state interests and  
16 they've all traditionally been in the domain in  
17 the states, and some states have chosen to, sort  
18 of, delegate or allow regional entities to perform  
19 some functions related to those, and I think there  
20 are a number of advantages to doing so.

21 But, again, with things like long-term  
22 contracts, I would say look, the ones looking out

1 for retail rate payers ultimate costs, or the  
2 state regulators in the states, and if they want  
3 to preserve long-term contracts, then I think that  
4 should be one of many issues that the RTOs and our  
5 ISOs should have their markets operate on top of.  
6 And there are countless public policies underlying  
7 the power system and the transmission that's been  
8 built, and the various subsidies that remain for  
9 all generations, versus have their form of  
10 subsidies and, you know, that hasn't changed.  
11 And, you know, in many respects the wholesale  
12 power markets just sit on top of all of that, and  
13 if the state wants to do some of those things, I  
14 think they should be able to.

15 MR. VAN WELIE: So, Rob, can I just ask  
16 as follow-up question here. I'm not sure of my  
17 facts here, but it seems to me that part of the  
18 challenge here, is can you design the market to --  
19 and I'm really coming off Audrey's point, to give  
20 the states what they want in some way, without  
21 having to use a whole barrage of different  
22 long-term contracting arrangements to buy the next

1 increment of what you think is needed. And I look  
2 at Texas as an example, where they lowered the  
3 barrier to entry for wind, and by putting in the  
4 crazy investment, \$6- \$7-billion investment.

5 My understanding is that the wind then,  
6 10,000 megawatts of wind were built without  
7 long-term contracts for the most part. So it  
8 seems to me there's an example of a very  
9 market-compatible solution, which is, you know  
10 that there's a barrier to entry which is the  
11 transmission investments, so you lower the barrier  
12 to entry, and then the combination of the natural  
13 pricing that's available in the market plus the  
14 production tax credits, does it's work, and you  
15 get the entry that you are looking for, as opposed  
16 to having to go and sign contracts to the wind.

17 So I just -- that's my perception of  
18 what happened in Texas, and I was wondering  
19 whether you could either confirm that or just  
20 expand on it.

21 MR. GRAMLICH: There are some long-term  
22 contacts. I actually don't know the full details

1 of percent there are, certainly a lot of merchant  
2 projects there, and so I don't -- I mean there are  
3 a lot of attributes of the Texas market and they  
4 could be very amenable to wind, and I would say  
5 all new generation in the open -- you know, the  
6 open market and the trading, helps a lot. You  
7 know, it gets back to this, it's an almost age-old  
8 question now of energy-only versus capacity  
9 markets, and personally I haven't spent a lot of  
10 time thinking about that lately, but it's still,  
11 you know, I think it's a very relevant question,  
12 and probably some of the changes in the market do,  
13 you know, cause entities like yours to think about  
14 it, the states to think about where do we want to  
15 go on that.

16 MR. VAN WELIE: Rich, back to you,  
17 queue.

18 CHAIRMAN COWART: All right. That means  
19 it's to Tim.

20 MR. MOUNT: So I just would like a  
21 comment about energy-only market, so I personally,  
22 am rather skeptical that they can remain viable

1 with a high penetration of renewables in storage,  
2 and as an indication, I just read a paper about  
3 the Australian market, where they are proposing to  
4 put the cap at \$80,000 a megawatt hour, if either  
5 of the Commissioners want to go and tell the  
6 Governor that, I'd like to go to the meeting with  
7 them.

8 But anyway, I want to get back to Bob  
9 and the New England market. It seems to me  
10 inevitable that long-term contracts are going to  
11 be attractive to new, particularly, wind farms  
12 and, you know, I see that side. What I don't see  
13 is why I want to buy that contract. And so my  
14 question is, when I sign up for that contract, am  
15 I trying to sort of get out of things, like  
16 undermining the capacity market? Do I pay for the  
17 extra reliability? I'm purchasing a very variable  
18 source, you know, somewhere up in Maine, and  
19 wherever I am, in Harvard or somewhere, that my  
20 load profile is pretty well behaved. So how do I  
21 -- maybe don't turn up on the peak. I mean, how  
22 do I pay for these sorts of extra ramping

1 reliability time costs.

2 MR. ETHIER: Okay. And I can, I'm going  
3 to try to combine my answer to your question with  
4 a -- sort of also address the Commissioners a sort  
5 of helpful enumeration of all the state concerns,  
6 because I think they are connected. The entities  
7 signing these long-term contracts in New England  
8 are typically state-backed entities, and they are  
9 signing contracts that are sort of embedded in  
10 there, are netted out of the contracts are the  
11 revenues that the wind resources are getting in  
12 the wholesale market.

13 So, it's up to us designing the  
14 wholesale markets to make sure that the wind  
15 resources face the price signals at the right  
16 time. So to the extent that the wind resource has  
17 to pay to generate during some hours, because they  
18 make the system less reliable by continuing to  
19 generate, that needs to be reflected in the money  
20 that we pay or don't pay to the wind resource, and  
21 with reflected into their willingness to sign a  
22 long-term contract with a certain price with a

1 utility.

2                   As far as the things like ramping and  
3 that goes, we don't actually have sort of a  
4 charge-back mechanism for reserves. Reserves are  
5 socialized, so I know there's a lot of discussion  
6 about whether wind resources do or don't impose  
7 additional reserve costs on the system, and we  
8 don't, you know, at this point we just charge out  
9 all those to load, so there's not a specific  
10 charge-back to any specific resource about any  
11 reserve or emergency costs that we may incur.

12                   But sort of stepping back from it, I  
13 think it's -- I think we are teeing up sort of the  
14 fundamental decision that really is -- relied on  
15 the states and is, if the states want to sign  
16 long-term contracts because they feel that that's  
17 the best way to achieve their policy goals, it's  
18 going to require some rewriting of the wholesale  
19 markets.

20                   You know, I think there are two paths we  
21 can go down and ISO, at least the one that I  
22 worked for, we are trying to say, if you want to

1 stay in the current market, here are the tools  
2 that actually will work well, that will allow us  
3 to continue on this current path. But if you want  
4 to go down a different path, and you want  
5 different form- control over the generation mix in  
6 your region. If RGGI is not enough, if SO<sub>2</sub> and  
7 NO<sub>x</sub>'s aren't enough, if RPS is not enough, then  
8 you'll probably need to come up with a wholly  
9 different approach that probably involves  
10 long-term contracts, and ripping up what we do  
11 today.

12                   And those long-term contracts have  
13 consequences; (a) they have to be for everybody,  
14 which a lot of the states, at least in New  
15 England, I don't think really are interested in.  
16 They are not interested in signing contracts for  
17 lots of generation, they just want the generation  
18 they want. And it also gets you back into the  
19 boat that we tried to get out of 15 years ago,  
20 which is long-term contracts sometimes don't look  
21 so good when you are partway through the  
22 contracts, but you can't get out of them.

1                   So, I'm not saying it's easy, and I  
2                   completely get that the states have a lot of  
3                   interests that they want to meet, but, you know,  
4                   as an RTO, the best we can do is say, here are the  
5                   choices that you have, you know, here are the two  
6                   paths, we are on one, here is what works best with  
7                   the current path, or you can do other things that  
8                   are going to create a lot of friction in the  
9                   current, or we can talk about going down some  
10                  different path which has its own pitfalls and  
11                  challenges to overcome.

12                  So, you know, if there's anything I want  
13                  to get across today, it's that sort of choice at  
14                  that sort of level, is maybe the path we are  
15                  headed towards, depending on how the states want  
16                  to push their public policy objectives.

17                  CHAIRMAN COWART: Sonny, I think you are  
18                  next.

19                  MR. POPOWSKY: Thanks. I wanted to get,  
20                  talk to you, Joe, a little bit about that hybrid  
21                  approach you talked about. As you remember, when  
22                  we restricted in Pennsylvania, I guess the

1        assumption was that the generation would -- you  
2        know, you would get the single market clearing  
3        price on the energy side. You'd get something  
4        like the capital cost of combustion turbine, on  
5        the capacity side. And that worked real well for  
6        you guys in MCF and my assumption, frankly, the  
7        one thing that I always say, is that these nukes  
8        would run forever. They were money machines. It  
9        would cost a penny or two to run them. You charge  
10       a nickel or a dime, and you just run forever. Now  
11       suddenly, we are seeing Exelon saying we are going  
12       to have to shut down -- we may have to shut down  
13       our nukes in Illinois, New York, Massachusetts.

14                    They need a different pricing model, and  
15       should that pricing -- would we be better off, we  
16       need a rate parity, if we want to keep these  
17       things running, let's just take the Minnesota  
18       approach, and put the capital -- you know, return  
19       to some kind of cost-based model, rather than one  
20       where you pay the market price when market prices  
21       are high, and make we pay enough to keep you  
22       running when market prices are low.

1                   MR. DOMINGUEZ: Sonny, I guess the first  
2                   thing is we definitely do need a different pricing  
3                   model, it's self-evident from what's already  
4                   occurring in these markets. We are, in our  
5                   Midwest units, Sonny, we are seeing 15 percent of  
6                   our off-peak hours trade negatively every year.  
7                   And so we are paying back the system at that  
8                   point, and the reality is, as we go back to 2002  
9                   or 2003, we weren't seeing that phenomena. And so  
10                  we are seeing an impact of distortions, we  
11                  certainly have the low-gas-price issue.

12                  I'll broaden your horizon a little bit;  
13                  it wasn't always the view that nuclear plants  
14                  would be cash machines, right. I mean the  
15                  original stranded cost payments were made because  
16                  the supposition was that the nuclear plants would  
17                  not be cash machines. In fact, would be losers in  
18                  the market for a period of time, when gas prices  
19                  went up, they were cash machines, and they did  
20                  very well.

21                  But as we've seen gas prices come down,  
22                  nuclear economics become quite elastic with gas

1 prices, and then we also have this impact  
2 associated with the fact that a lot of resources  
3 in the market are getting payments that cause them  
4 to act in ways that traditional market  
5 participants would be active. Back in the days  
6 when we were originally thinking about markets in  
7 Pennsylvania, I don't think anybody was thinking  
8 that there would be out-of-market payments that  
9 would actually attract people to bid in that  
10 negative 40, negative \$50 a megawatt hour just to  
11 keep running to seek some sort of payment.

12 So, we have this new world we are living  
13 in, and I suggest he hybrid much, because I share  
14 Chair Zibelman's concerns. You know, the  
15 conundrum we are in, is that if we are at FERC and  
16 we are talking about carbon, often times, the  
17 predominant view I would say of FERC is, we don't  
18 regulate carbon, that's not within our  
19 jurisdictional province under the FDA. If we then  
20 get into a situation where FERC is saying, we  
21 can't regulate carbon, and it is also implementing  
22 things that interfere with the states' ability to

1 regulate carbon, then I would suggest to you that  
2 these markets are going to be very short-lived.

3           They were ultimately at the very  
4 beginning, voluntary endeavors by the states, as  
5 you pointed out, and that willingness to continue  
6 with markets isn't going to go forward if the  
7 federal government who are blocking the states,  
8 were being unable to act on its own, forces us  
9 into a position where we have to choose markets or  
10 deal with carbon with many of us here in the room  
11 waving that carbon mitigation, is a far more  
12 important thing than preserving a competitive  
13 market at the end of the day for our country and  
14 for humanity.

15           So I do think we do need a different  
16 pricing model. What I'm suggesting to you is that  
17 units that have a particular environmental  
18 characteristics needed to be included in that  
19 pricing model. I think they will draw revenues  
20 from the residual model, from the residual market  
21 that will be fossil market. They'll get some  
22 energy in capacity payments, whatever those things

1       might be, but let's face it, let's not kid  
2       ourselves. The construct today is whether it's a  
3       federal payment PTC or the ITC, or state RPS  
4       payments, we already have a hybrid model, where  
5       the dominant income stream for many resources is  
6       outside of wholesale energy market revenues,  
7       that's just the truth of it today, and we all  
8       certainly understand that.

9                   I think the difference is nuclear. I  
10       think the question you pose is a very good one.  
11       How far do you go? Are you just ensuring that  
12       nuclear plants remain in operation during  
13       difficult times? Or are you saying, hey, if gas  
14       prices take off again, I want a share of the  
15       profits, so that they don't become cash machines.  
16       I think those are all tradeoffs, and I think it's  
17       -- I think that this is very clearly something  
18       that the New York Commission is going to wrestling  
19       with over the next few months.

20                   How to make that trade off in a way that  
21       doesn't produce asymmetrical results where it's a  
22       win for industry but consumers aren't getting the

1 benefit in times of high prices. I think those  
2 things need to be sorted out, but I am no longer  
3 confident that the wholesale market as designed,  
4 and given the increasing penetration of renewables  
5 is going to provide revenue adequacy for the  
6 machines that currently in America, produce over  
7 60 percent of the nation's zero carbon  
8 electricity. And the only machines that we have  
9 that produce it, on demand when our customers need  
10 it, without water being in the river, the wind  
11 blowing, or the sun being out.

12 I think they are unique, I think they  
13 are our bridge to a future with a lot of  
14 renewables and a lot of storage. I think we need  
15 to preserve the machines, and we need a new  
16 construct to do that. And again, I applaud the  
17 New York Commission for stepping forward and doing  
18 that.

19 CHAIRMAN COWART: Paul?

20 MR. CENTOLELLA: I somewhat hesitate to  
21 jump in on this, because I am sort of veteran of  
22 the energy-only in the capacity market debates,

1 and the MOPR debates as a Commissioner, but I --  
2 So let me give you a little context and then ask a  
3 question. I mean, I always felt, historically,  
4 when we were talking about energy-only, and  
5 capacity markets. The capacity market, it really  
6 ought to be a fall back.

7 I mean, you are allowed more scarcity  
8 pricing in the energy market, and you'll create  
9 the flexibility that that creates, and you'll  
10 maybe have a capacity requirements, but not have  
11 the capacity requirement be necessarily be the  
12 driver for all of the new generation that comes  
13 in. I also, as a Commissioner, was fond of saying  
14 if -- Well I certainly wouldn't want to enter into  
15 a long-term contract to wipe out the new entry.

16 If my neighbors down the road and some  
17 other state want to do that and want pay an  
18 uneconomic price, I'm more than happy to benefit  
19 from the low market prices, because I don't think  
20 that's a sustainable model for any state. You  
21 know, you are going to end up wiping yourself out  
22 of the competition for the new industry if that's

1 the choice that you make.

2 But I want to come back to, you know, a  
3 question of how we -- and I also want to say that  
4 I fully agree that we ought to be looking at  
5 carbon prices rather than subsidizing a bunch of  
6 things, and I want to come back, though, to the  
7 question of, how do we get closer efficient  
8 economic markets rather than -- I mean, yes, we  
9 call capacity a market, but it's really an  
10 administrative requirement that says, you know,  
11 that these have to have this much forward  
12 obligation whether or not their individual  
13 customers would have actually chosen that or not.

14 And so I want to come back to the  
15 question of -- because I sit here troubled, what  
16 can DOE do about all of this given that we all  
17 know that this is going on and stakeholders  
18 processes in it (inaudible). And I come back to a  
19 question that always struck me as an important  
20 question when we were having the energy-only  
21 versus capacity market today, and that is the  
22 question of, can we develop metrics so that we can

1 better tell whether or not, you know, we are in  
2 fact developing the capacity where it's needed.

3 So that, if in fact, you know, we have  
4 to develop an alternative to MOPR, which is kind  
5 of a -- this is sort of a sledgehammer, sort of  
6 approach to dealing with this but, you know, we  
7 actually have to look at whether or not, the  
8 combination of markets that we have is creating a  
9 liquid forward market, is creating, you know, a  
10 real long-term contracts voluntarily for people to  
11 enter into, you know, these kinds of arrangements.

12 Can we think about a question of  
13 metrics? Can we ask DOE to be thinking about a  
14 question of, what would be appropriate metrics to  
15 know whether the market structures that we have  
16 are actually working to produce a viable secure,  
17 long-term supply? And what would those look like  
18 in your view?

19 CHAIRMAN COWART: Rob?

20 MR. ETHIER: Well, certainly to me the  
21 most immediate one would be -- Well, I share your  
22 -- Well, I have my own concerns about reliability

1 standards, but as long as we have them, that's a  
2 metric, right? Are you meeting your reliability  
3 standards that are imposed on you by your -- or  
4 that you agree to live by for your reliability  
5 entities? So, for us it's MPCC and NERC, and it's  
6 the one they intended standard which we all know  
7 and have debated many times.

8           You know, are, over time, the markets  
9 meeting that without needing extraordinary help.  
10 I think in New England, it's only the last few  
11 years that have been useful, because before that  
12 we just had such a large overhang that it's sort  
13 of an irrelevant period of time. I think in the  
14 last three auctions it's been -- the signals have  
15 been, yeah, the markets are working to meet that  
16 sort of very basic metric. It would be great to  
17 have a few more years before we draw any  
18 conclusions for sure, but the signs, at least  
19 right now, are pointing in the right direction.

20           To me, that's probably the most  
21 important one as long as you are going to have  
22 reliability standards. You know, if we went to

1 energy-only, and we said, the value of a megawatt  
2 is X, and that's what we are going to pay, and if  
3 we can't get it at that, we won't have any  
4 electricity, or we won't have as much as people  
5 would want. We could go that route too, but that  
6 requires a lot of change beyond the RTO level.

7 MR. GRAMLICH: So, this brings me back  
8 to, you know, FERC looking at this in the early  
9 2000s, and there are some FERC whitepapers at the  
10 time which basically said, look, reliability  
11 services are public goods, and the technical  
12 economic definition of that is non rival and non  
13 exclusive, and in the electricity markets you  
14 can't physically curtail free-riders and  
15 therefore, you know, it's of social benefit, but  
16 the private parties won't, on their own, procure  
17 the needed services.

18 Therefore, something is needed, and then  
19 the choice for the Commission was, okay, do we  
20 require capacity markets, or do we simply allow  
21 them and the -- I can't know if -- I don't  
22 remember if this is written down, but ultimately

1 the Commission did not require them, but said, in  
2 the theory, at least, as I recall it was, you  
3 could do the energy-only market to just price the  
4 heck out of the free- riders when the day comes,  
5 and you really need the power and they didn't show  
6 up with any.

7 And it's, I think, Tim said, you know,  
8 that can lead to a very high energy price, and I  
9 know Pat Wood was comfortable with that model in  
10 Texas, and that was his thinking coming into FERC  
11 because, well, let's just use that, but if regions  
12 don't want to get to that high spot energy price,  
13 you know, particularly as they are kind of doing  
14 this right after California, then okay, got it.  
15 You know, so let's allow a capacity market.

16 MR. VAN WELIE: I have to chuckle,  
17 because I do need to refresh your memory, because  
18 I very distinctly recall getting an order FERC in  
19 2003 saying, you shall implement a capacity  
20 market, and the reason was we were entering into  
21 all of these out-of-market contracts to keep the  
22 resource base in place. So, we had a situation

1       which if fear returning to at some point, but the  
2       construct at the time was, because of constraints,  
3       there were certain resources that weren't making  
4       enough money, but we needed them for reliability,  
5       so we had to enter into reliability contracts, and  
6       in the end, the direction we got from the FERC  
7       was, you need to do something about that, you need  
8       to get that money into the market, as opposed to  
9       having inside contracts; and we were told to go  
10      and put in a capacity market.

11               MR. GRAMLICH: I assume you read it. I  
12      don't recall that, I mean it could be a lesser  
13      evil of the side reliability payments, I don't  
14      know. But, you know, in terms of standard market  
15      design and what we were requiring nationally,  
16      that's what I recall, and I think the same goes  
17      for not just long-term planning capacity, but  
18      short-term operating, which is all these services  
19      are things that no individual wants to go out and  
20      say, hey, I want to get some short-term operating  
21      reserves, or some frequency response.

22               These are system needs, right? And so,

1       therefore there is a need for a public policy, or  
2       a regulatory regime to either require the  
3       procurement of them or, you know, put it into a  
4       market.

5                   MR. CENTOLELLA:  So, just to back up a  
6       little bit to the debate from the yearly 2000s, I  
7       mean, the MISO position at that point, or at least  
8       the MISO management position at one point is you  
9       could have either a forward contract, or you could  
10      have a security interruption price, at which point  
11      you would say, I'm ready to get off the system,  
12      but you had to have one or the other.  And that  
13      gets you to the same place, and put some limit on  
14      how high the price can go, and creates an  
15      incentive for rendering the contract.  This is  
16      what we anticipated people would do.

17                   MR. DOMINGUEZ:  Could I just jump in?  I  
18      think you've -- first of all, I don't think we  
19      have real markets when we talk about the capacity  
20      product.  It's an administrative market, where the  
21      only thing that is a market about it is we have  
22      bids in an auction, but even the seven- year lock

1 in, in New England, that's not available to our  
2 existing resources in New England, it's all  
3 vintage priced, and it's one particular product,  
4 one year of capacity, three years out, and the  
5 difference between, frankly, Texas and every place  
6 else, is that Texas doesn't have an administrative  
7 model in place, that says, we are going to  
8 guarantee we are going to have enough generation  
9 in place to meet peak demand.

10 They are hoping that the prices alone  
11 will bring the power plants there, that's not a  
12 choice that a lot of the states we do business in;  
13 we do business in Texas are willing to make. But  
14 going back to the metrics, one of the metrics that  
15 would be interesting, what is the required carbon  
16 price to literally do what you are suggesting we  
17 do, and take the subsidies out of the market?

18 And I think what we'd find, is for many  
19 states that have goals around solar, for example,  
20 or goals around wind, that required carbon price  
21 would have to be a pretty muscular carbon price.  
22 I'm talking over \$100 a ton of CO2. And that

1 carbon price would have a lot of effect on the  
2 market. I think we just have to be honest with  
3 ourselves that if, again, you take the DOE report  
4 that issued in the spring of '15, and you say,  
5 okay, DOE has estimated the cost of wind to be 70  
6 to \$90 of megawatt hour. I mean, unsubsidized  
7 basis. DOE has estimated the cost of new nuclear  
8 to be 140 or \$150 a megawatt hour on an  
9 unsubsidized basis. And wind didn't -- or solar  
10 in a distributed form, in the hundreds of dollars,  
11 right?

12 Are we really saying that it's realistic  
13 that we are going to impose a carbon price that is  
14 going to bring these resources in the market? Or,  
15 again, should we just start to begin to realize we  
16 are in a hybrid market, and until these resources  
17 that we really like show dramatic, and I mean  
18 order of magnitude changes in their cost  
19 structure, I think it's unrealistic that we are  
20 going to get all of the results we want simply  
21 through the imposition of a carbon price, and  
22 achieve what we also want to achieve on the

1 consumer price side of the equation.

2           So as I just began, I think we are in  
3 this space we often to each other, boy, it would  
4 be nice if we took all the subsidies out, just had  
5 a carbon price. DOE and others need to do a  
6 pretty good job of explaining exactly what that  
7 really would mean in terms of consumer prices, and  
8 in terms of the needed carbon price, and I think  
9 once folks see those numbers, we are going to  
10 realize that we are not going to be in a pure  
11 market world.

12           MR. GRAMLICH: If I could just respond a  
13 little bit. I mean if you -- I suggested a model,  
14 that's out in the press yesterday of: no  
15 additional targeted incentives at all, but just if  
16 you put in a carbon price or a model for the  
17 Midwest region, a significant carbon reduction,  
18 they got something like 200 gigawatts of wind,  
19 just on that basis.

20           So I think we are going to a future of  
21 open competitive markets with the externality  
22 factored into the price, and that's sort of the

1 natural evolution, and I think the wholesale power  
2 market structures are generally robust to that  
3 future, and I don't think it's an either or  
4 capacity markets, carbon price would have over the  
5 wholesale power markets if you can sit on top of  
6 whatever environmental regime we have; generally,  
7 quite efficiently.

8 MS. ZIBELMAN: Can I just follow up on  
9 Joe's point, on the role of the DOE, because I  
10 think this is an important issue. I was just  
11 whispering to my neighbor here, "Isn't he glad  
12 that Southern company did what Southern company  
13 did." But the fact of the matter is, we were  
14 looking at in-city gas prices in New York City  
15 last week, and they were just about a buck.

16 Several years ago those prices were \$15.  
17 I do think there's a role for the DOE to say, we  
18 have to get realistic about this, because the  
19 premium we would have to pay above those gas  
20 prices today, is really astronomical, and that's  
21 why I think we have to be more surgical about how  
22 we are starting to approach this issue because we

1 just never have had these kind of gas prices t  
2 deal with, and I think we are sort of fooling  
3 ourselves if we say this could be just in LMP.

4           There is truly an issue that we have to  
5 address as a country in terms of, if we once  
6 maintain resource diversity, but we recognize you  
7 want to take advantage of low and natural gas  
8 prices, what does the mix need to be -- look like,  
9 and how do you implement policies around that?  
10 Because I don't think -- no matter what we do  
11 around the capacity price, it's never going to  
12 really -- or the market, it's never going to  
13 really address this issue of around what's really  
14 happening in -- around the fundamentals of fuel.

15           MR. VAN WELIE: Actually, Audrey, I  
16 agree with that last point. So, let me just -- I  
17 think what you are doing in New York is going to  
18 be really interesting to watch, which is I think,  
19 and if you look at what the states are doing with  
20 regard to -- with they are heading with renewable  
21 energy standards and so forth, the question is: Do  
22 they want to do something similar for nuclear in

1 the end?

2 CHAIRMAN COWART: Roy?

3 MR. THILLY: Thank you. First of all I  
4 think the distinction that Rob drew between where  
5 there's retail competition or not is really  
6 fundamental to this issue. And Audrey is right,  
7 raising the right questions. But I do wanted to  
8 hold this dichotomy between simply markets, and  
9 short term-capacity markets, or long-term  
10 contracts, from the point of view of where I came  
11 from which is an obligation to serve state, or  
12 municipal and co-opted as an obligation to serve  
13 its load. What we are looking for, we are looking  
14 for is a diverse portfolio of capacity resources,  
15 short, intermediate and long-term.

16 Long-term is equivalent to rate base in  
17 the investor-owned world. It's very risk to be  
18 all long-term, it's very risky to be all  
19 short-term, and not to have energy or protection  
20 in that market. So, if the markets can provide  
21 various forms of capacity in terms of capacity, I  
22 think that's not dissimilar to what the states are

1 looking for in terms of balancing fuel diversity,  
2 and a lot of other concerns, to put that mix  
3 together.

4 And then markets need to serve that  
5 need, I think. But the other observation I wanted  
6 to make is on the nuclear side. We have one  
7 nuclear power plant with constant shutdown, and  
8 that was in the market, in the energy market, and  
9 the energy market only, couldn't survive. The  
10 amount of coal generation the following year went  
11 up in the state by about 25 percent. A little bit  
12 of that was the change in gas prices, almost all  
13 of it was nuclear being supplied with (inaudible)  
14 by coal. If you are trying to reach carbon goals,  
15 that is a really scary proposition. And so I  
16 think we had to come up with some sort of  
17 structure that doesn't rule nuclear out of the  
18 market. It's certainly without long-term  
19 contracts I don't see how you could possibly have  
20 new nuclear units.

21 CHAIRMAN COWART: All right. I'll call  
22 on myself. I've whittled down my comments to just

1 a couple. One observation I wanted to just echo  
2 is that we do need to keep in mind the  
3 conversation we had yesterday, as Gordon pointed  
4 out, alongside the conversation we are having  
5 today, because if we want accurate price signals  
6 to drive flexible and distributed resources at the  
7 distribution edge, and we need to have a wholesale  
8 market that actually is delivering some meaningful  
9 prices, to reveal that value, and so this is just  
10 to remind you to -- all of us -- you know, that we  
11 actually have to remember what we talked about  
12 yesterday too, and as we talk about the design and  
13 the wholesale market.

14 A second point that I'd like to make in  
15 response to Tim, is that scarcity pricing doesn't  
16 really have to be that scary. If in fact we have  
17 created a market that allows demand, response,  
18 distributed resources, storage and those other  
19 resource to play because they are getting those  
20 price signals. Then in fact, as we saw in some of  
21 the slides yesterday, a lot of that volatility is  
22 pulled out of the market by the existence of a

1 much more diverse set of distributed resources as  
2 well as supply side resources. I assume I'm  
3 stating something that people can generally  
4 accept.

5           The third, I guess I would agree that we  
6 are not going to see public policy in this country  
7 that injects high enough carbon prices to be the  
8 drier of all of these, theoretically efficient  
9 solutions. You know, I spend my time these days  
10 working in Europe and the Europeans have a hard  
11 time, even though they are intellectually  
12 committed to it, they have a hard time seeing  
13 carbon prices, you know, getting above the  
14 equivalent of 13 or \$15 before they start getting  
15 worried about it.

16           Now, I'm going to go to a fundamental  
17 question I just want to put on the table. There's  
18 kind of an assumption in all of these  
19 conversations that the wholesale markets reveal  
20 short-term marginal costs, and that's what the  
21 market clears at. And therefore that's all the  
22 generators get, unless we come up with some other

1        thing that we give them. And so I just want to  
2        ask the question: Is that true?

3                    If you had an energy-only market, with  
4        the opportunity for buyers and sellers to engage  
5        in various kinds of other instruments, are we in  
6        fact stuck in a world where, when the wind is  
7        blowing the price is zero or below, and we can't  
8        do anything about it, and therefore everybody,  
9        including wind generators, is losing money. Or,  
10      do market participants actually find ways around  
11      that?

12                    You know, in the vertically-integrated  
13      states, as the Chair pointed out, the ERP process  
14      and rate-base takes care of it, but don't market  
15      instruments take care of it in other more fluid  
16      markets? And that's just a -- that's a totally --  
17      how do you say it -- straightforward question,  
18      because it seems to be an underlying proposition  
19      in this whole conversation.

20                    MR. GRAMLICH: So, I have thought on  
21      that, and I hope I cannot speak for my  
22      organization because we have absolutely no

1 position on these issues. But again, back in the  
2 FERC days, considering market design, there was a  
3 lot of sort of economic study of that question,  
4 and you can -- I think that most economists  
5 consensus, and Bob and correct me, was that you  
6 could, in theory, do an energy-only market, you  
7 have to have -- but you have to look very closely  
8 at what is that ultimate very high price on that  
9 peak, you know, summer day? And it's not the  
10 operating cost of the last unit dispatched, but  
11 it's something higher that reflects true scarcity,  
12 and it probably goes up to the value of lost load  
13 which, again, no regulators are comfortable  
14 determining that, because how the heck do you set  
15 that and it's not based on supply and demand bids,  
16 but that's, in theory, the way you do an  
17 energy-only market.

18 MR. ETHIER: That's good memory. And,  
19 you know, the discussion hasn't change a lot in  
20 the last decade or so. You know, that's sort of  
21 the solution to an end, it gets more complicated  
22 when you recognize that you actually can't turn

1 off the people in a very disaggregated way, you  
2 can't turn off the people who have really low  
3 values of energy and let the ones who have very  
4 high values of energy stay on, because we just  
5 don't have that capability yet. And until you  
6 have that, it really limits what you can do,  
7 unless you are willing to make these sort of  
8 broad-brush policy decisions, which is essentially  
9 what we do it one day in ten.

10 It's a decision about how much  
11 reliability is worth, it's a reliability number,  
12 but it's very easily translated into a dollar  
13 number, and it's actually something that we have  
14 actually done in our markets, and it's reflected  
15 in our market goals. And until you get away from  
16 the need to do that, and get down to this  
17 disaggregated, everybody reflects their own  
18 values. It limits what the market is going to  
19 naturally bring forward, it's sort of on our mind,  
20 because you can free ride, you can say, if we lose  
21 100 megawatts, what are the odds, I'm going to be  
22 part of the rotation of outages, pretty low.

1                   CHAIRMAN COWART: It seems like you just  
2                   addressed part of what I was talking about which  
3                   was this business of, you know, in the markets  
4                   that we are talking about going to where demand  
5                   side aggregators have a lot of different customers  
6                   who are signed up to be turned off at different  
7                   price points, and different resources, or either on  
8                   or of depending on being blackouts it's a question  
9                   of who is willing to be interrupted for a price.  
10                  That's on one side of it. I agree that in the  
11                  very, very extreme event you do have an  
12                  involuntary interruption backup. But on the other  
13                  side, I'm really asking the question, if I'm the  
14                  generator in a market where let's just say, it's  
15                  energy-only and some days -- some hours it will be  
16                  negative, and some hours it might be pretty high.  
17                  And I don't like that volatility. I don't want to  
18                  have to live on a few uncertain hours.

19                         And I'm a retail supplier on the other  
20                         end of the market, and I don't want to have to  
21                         have that much volatility on my product, so I want  
22                         to engage in a contract with the supplier, or a

1 set of supplier, and my question is, you know, and  
2 in some places they call it contracts for  
3 differences, and people can cover both generators  
4 and retailers can cover volatility by entering  
5 into a contract for a difference.

6 What is it about the markets in New  
7 England, New York or MISO that lead us to believe  
8 that we have to live in this highly volatile world  
9 instead of contracts for differences world?

10 MR. ETHIER: I think the answer is, the  
11 majority of generators for the majority of their  
12 output do live in a contract for differences  
13 world. You know, most of them aren't -- for most  
14 of their resources aren't going hour to hour spot  
15 prices. You know, we, as ISO do get some view  
16 into that, and we are constantly -- we actually  
17 settled a bunch of those contracts for folks, so  
18 it's certainly possible and likely, I think the  
19 disconnect is, you don't see those very long term,  
20 at least in New England, largely because of the  
21 retail competition structure.

22 No retail -- I don't know about no, but

1        few retailers have more than a one-year horizon so  
2        they don't want to sign contracts for more than  
3        that. And that is what prevents the 10 and  
4        15-year deals which, if you talk to both sides  
5        independently, they are interested, but the  
6        retailer is saying, I don't know if I'm going to  
7        have load in five years, much less 10, and the  
8        generators, they are like, there is nobody out  
9        there who wants to sign a contract with me for  
10       that long, because I would love to hedge my output  
11       too, or at least a portion of it.

12                    MR. DOMINGUEZ: Yes. I would just add  
13        that I don't even seen that from the utilities in  
14        the States we do business where the utilities are  
15        seriously interested in hedging a significant  
16        amount of the load for 10 or 15-year periods, part  
17        of it is, I think one of the premises of your  
18        question is, that the contracts provide more  
19        money, more value opportunity for the generators  
20        than going to the spot market. And Bob said, all  
21        the generators are hedging 1, 2, 3 years forward,  
22        but nothing really long-term and the market is so

1 transparently clear, there's no reason in the  
2 world someone would.

3           They are going to always reference the  
4 market prices, and there's no reason someone would  
5 go real long at this point, on something that is  
6 substantially higher than the market, and there is  
7 a liquid gas market that's a 5- or 10-year market,  
8 some would say even a 20-year market, that  
9 correlates pretty closely to power prices, and I  
10 just don't think that -- I don't think the answer  
11 to this question lies in, go out and get long-term  
12 contracts. First, I don't think there's a  
13 counterparty for it, and second, even if there  
14 were I don't think it would produce a revenue  
15 stream that is significantly more adequate than  
16 the one we face in the short-term markets.

17           CHAIRMAN COWART: All right. Thank you.  
18 Carl?

19           MR. ZICHELLA: Thanks. Interesting  
20 conversation, I found myself taking tons of notes,  
21 and little snarky asides of my own about some of  
22 it to be honest with you. It just strikes me how

1 different things look in the Western United  
2 States, and what we are talking about here today.  
3 We are looking at trying to get more of an  
4 organized market approach across more of the west,  
5 to help facilitate some of the policy goals Audrey  
6 enumerated, and it seems like there is a construct  
7 here that we can create that isn't necessarily  
8 what has been created so far.

9 I think, certainly, there will be some  
10 kind of a hybrid approach because there are many  
11 state policy mandates across the West; in fact  
12 most of the western load is under a high RPS now.  
13 Not just a short one, a high one. From Colorado  
14 to California, to Oregon, you know, we have lots  
15 of concern about climate policies, coastal states  
16 are going to be heavily impacted by climate  
17 change. So we are seeing many state policies that  
18 are very aggressive across the board.

19 How we have a market context in all of  
20 that, is going to be very interesting. However, I  
21 think it's very possible because we are in such a  
22 highly vulcanized situation right now with 38

1 different balancing authorities, a bus with 38  
2 drivers, essentially, running a situation -- a  
3 grid that's almost hostile to renewable energy  
4 resource integration, because of this  
5 vulcanization and artificial congestion on  
6 transmission.

7           You know, we are going to preserve state  
8 prerogatives, and we are going to have some sort  
9 of a market I believe, it's not going to happen.  
10 It's not going to be easily done, but how we put  
11 that together is going to be a bit of an adventure  
12 especially given what I've just heard today, we  
13 are not going to have -- I don't believe we are  
14 going to have a capacity market in the west. We  
15 don't need one. We are going to have plenty of  
16 resource adequacy without a capacity market, and  
17 because of the huge footprint in the West, it's  
18 clear from all the studies that have been done,  
19 renewable energy integration can be done very  
20 comfortably.

21           We do have good energy efficiency  
22 programs across most of the region. We do have a

1 growing increment (inaudible) that we are going to  
2 be relying upon. Those things make the lift  
3 easier, but also the geographic diversity that  
4 exists in the operational hours which we've  
5 studied in the west, that lets us match renewables  
6 with renewables, and wind being particularly  
7 useful in this regard, helping to even deal with  
8 solar ramps in many cases, give us an opportunity,  
9 having a diverse renewable portfolio to do that.

10 Thank goodness we are not saddled with  
11 tons of nuclear power, we are getting out from  
12 under the nuclear fleet that we have. They  
13 weren't intended to run forever. They reached the  
14 end of their design lives in many cases, extending  
15 their lives is going to require massive infusions  
16 of capital to keep the plants running, especially  
17 at once through cooling requirements coming into  
18 play.

19 We are not going to be building new  
20 nuclear power plants in the Western United States;  
21 that would be idiotic for us really, frankly,  
22 because they are so inflexible, it's just not in

1 the cards for us. Where we are headed is much  
2 more variable generation dominating the  
3 electricity market, and a little bit of flexible  
4 thermal resources to fill in those gaps. That  
5 seems to be where we are going. And having a  
6 market to help dispatch those resources more  
7 efficiently with what we are doing, is really one  
8 of the big benefits, and it's an operational  
9 benefit, as much as it is an economic benefit for  
10 us in the west.

11 So, when I look at the landscape that we  
12 are facing, and trying to learn as much as we can  
13 from what the RTOs have done in the eastern  
14 interconnection, take the good stuff that's been  
15 done, try to avoid the errors, so we are in kind  
16 of a good place, because we can learn from what  
17 hasn't really worked that well. And we don't have  
18 the same resource mix, 80 percent of the coal  
19 plants in the United States are in the Eastern  
20 interconnection.

21 And we are retiring in the western coal  
22 plants at a similar rate, they are going out of

1 the stack very quickly. And the markets give us a  
2 chance to run out those plants that are least  
3 efficient, that shouldn't be kept long-term, that  
4 should be kept on life support by capacity  
5 payments, and we really don't need to do that. So  
6 I think we may find a third way in the Western  
7 United States. I think the distribution grid  
8 challenges are actually pretty similar as we heard  
9 yesterday, but the bulk system is different.

10 And I think we are going to have a  
11 different approach to this. We are actually  
12 wrestling with what it ought to be right now. And  
13 it's a very real question for us, about what the  
14 construct will look like, how it will be governed,  
15 how we'll deal with differing state goals, because  
16 just like in the Eastern Union Connection we have  
17 coal states, and we have renewable states. It  
18 just so happens that most of the load isn't in the  
19 coal states.

20 So, the trend away from coal isn't going  
21 to be interrupted any time soon. I think I'll  
22 stop there. It's just been drinking from a

1 firehouse for the last hour-and-a- half here, and  
2 I've been saving it up, so I apologize for being  
3 all over the map here. But I'm not buying into  
4 the nuclear thing and trying to keep them  
5 operating much longer, it's not going to happen.

6 The older plants, they are going to have  
7 the higher O&M costs, when you start replacing  
8 reactive vessel heads all over the steam  
9 generators, and every single pressurized water  
10 reactor in the United States, and building new  
11 cooling towers, you know, there's no way we are  
12 keeping them afloat.

13 MR. DOMINGUEZ: Well, I think I have to  
14 answer that. Look, whether you choose to save  
15 nuclear plants or not, those are decisions that  
16 need to be made regionally. I'd simply point out  
17 a couple of things. A number of the places you  
18 were referencing also have some of the highest  
19 retail rates we see in the country. And Germany  
20 as an example, that has gone in the direction you  
21 are describing where they are shutting down the  
22 old nuclear plants and relying on renewables has

1 driven its average retail rate over USD0.40.

2 Now there is a lot of hydro in the West  
3 that dampen some of the price impacts, and there  
4 are some states that enjoy those benefits, but it  
5 hasn't exactly been a success story in Germany  
6 shutting down a third of its nuclear reactors,  
7 seeing the highest prices for electricity in  
8 Europe, and not making any progress on carbon  
9 reductions. And so there have been studies that  
10 indicate that the implied price of carbon  
11 reductions in Germany, net of the retirement of  
12 nuclear units is 1,200 bucks.

13 But if you are making a judgment that  
14 this more than just words, but you have numbers on  
15 a sheet of paper that says, look, the cost to  
16 keeping the nuclear plants open is less, and the  
17 cost of replacement is cheaper, then replace them.  
18 The analyses I've seen, I think some of the  
19 analyses that have done in other states, indicate  
20 that if you have a unit, that is a base load unit  
21 that could provide guaranteed zero carbon  
22 electricity for \$0.35 or \$0.04 a kilowatt hour,

1       then that's probably a pretty valuable resource,  
2       if what you are trying to do is replace that with  
3       some sort of combination of solar and storage that  
4       may come in substantially higher than that.

5                    But those are judgments, I'm not trying  
6       to ram nuclear down anybody's throat. Everybody  
7       needs to kind of make their own economic  
8       decisions. I could tell you have a lot of energy  
9       about it, and I'm not going to push back on the  
10      energy. It's simply the case that I think, what  
11      we need to do is look at the relative carbon value  
12      of saving those units relative to alternatives.  
13      And if the alternatives are cheaper, you know, God  
14      bless.

15                   MR. ZICHELLA: Sure. And if I could  
16      just say quickly, I mean, I think that we are  
17      going to start throwing the numbers around. Let's  
18      say that in the decommissioning costs, let's add  
19      it all in. Let's add in, you know, the cost of  
20      retrofitting these plants to keep them running  
21      safely, let's add in the cost of nuclear waste  
22      remediation. Do you want to talk about subsidies

1 and, you know, the investment or production tax  
2 credits, you know, compared to what nuclear has  
3 gotten, you know, I have to tell you that over the  
4 long haul here, these plants are not intended to  
5 operate for 60 or 70 years. They just weren't  
6 designed for that. And we have had massive  
7 failures with major increments that cause the  
8 shutdown of the plant because there  
9 weren't even replacement parts for these things,  
10 so I think this --

11 MR. DOMINGUEZ: Yes. I don't think we  
12 are going to get to the bottom of this --

13 MR. ZICHELLA: This conversation is not  
14 going to -- Right, we are not going to get to the  
15 end of this one today.

16 MR. GRAMLICH: Rich, just to comment on  
17 the other half Carl's comment, I couldn't agree  
18 more about the importance of the large open  
19 markets that the west is moving towards, and I  
20 appreciate Carl and NRDC's leadership in moving  
21 that way. It's not always, I guess, been the  
22 environmental communities' major focus to expand

1 markets for everything, but it's absolutely  
2 essential, particularly in the west, to get this  
3 regional trading that allows renewables to  
4 integrate on a reliable and low-cost way.

5 And I also agree that some of these  
6 complexities with the New England and retail  
7 access issues, are not -- I don't think those are  
8 really concerns in the CAISO, you know,  
9 restructuring going on. So, hopefully it will be  
10 -- at least that's one problem you won't have in  
11 those debates, but I'm sure there are many others.

12 CHAIRMAN COWART: And, by the way, the  
13 Europeans and the large footprints of the American  
14 markets, I mean, I see that every day, it's one of  
15 the problems in Germany is that the footprints  
16 they are trying to just balance within is too  
17 small. We've got Merwin with his card up, and I  
18 think I need to alert everybody to the following,  
19 we will end on time at 12:30 and we have one more  
20 business which Carl will take us through, which is  
21 to come, but if we can get it done in time. Okay,  
22 so first, Merwin.

1                   MR. BROWN: Thank you. Admittedly this  
2                   is probably an experimental question, but since we  
3                   are really here to guide DOE and their main thing  
4                   is technology, I think, safe to say, open up your  
5                   minds and let your imaginations run wild, and  
6                   don't let cost, at the moment, get in your way.  
7                   Is there a technology that could make your lives  
8                   easier? That would make some of these issues go  
9                   away, if not all of them? So, you know, is it  
10                  energy storage, is it an ability to be able to  
11                  calculate or determine and measure the value of  
12                  something more accurately than you can now?

13                   Is it a forecasting tool that is much  
14                  better than what we have now? I don't know, and  
15                  I'm beginning to lead you now, but is there  
16                  something that you would say, hey, if I could have  
17                  this technology tool that would make our lives a  
18                  lot easier?

19                   MR. GRAMLICH: I certainly can think of  
20                  a lot of great studies that DOE has supported, on  
21                  sort of integration of renewables and the value of  
22                  transition across multiple regions which needs to

1 be done again. The technology, I mean certainly  
2 the great operations practices are very important  
3 and using the data from the synchrophasers, and  
4 all the other kind of data that I don't follow  
5 closely, but the technology that's been deployed,  
6 I think helps grid operators. Gordon would know  
7 better than I and others here but, you know, you  
8 do have to operate the grid with, I think, more  
9 data, more information, more forecasting in a high  
10 or a low-carbon -- high-renewable low-carbon  
11 environment.

12 CHAIR HEYDINGER: I think from our  
13 perspective, are becoming increasingly focused on  
14 being able to -- where we locate resources, and  
15 historically states, in particular, have been very  
16 responsive to the proposals brought to them rather  
17 than creating and figuring out, electrically,  
18 where would new generation and what size would be  
19 most strategically and cost-effectively placed.  
20 And so I think, as DOE moves forward, getting more  
21 focused on the locational attributes could help  
22 with both cost and resiliency. So that's the

1 direction I'd like to see.

2 MR. ETHIER: And as far as renewables  
3 integration, certainly one of the big focuses we  
4 have now is improved forecasting tools, and to the  
5 extent that those improve that will help us do a  
6 better job of dispatching the grid. You know, we  
7 have tools now, they could work a lot better.

8 MR. VAN WELIE: A quick question. So,  
9 Rich, I have just a -- I have a response for  
10 Merwin. It occurs to me, and it triggered the  
11 same thing I said yesterday which is, what I've  
12 learned here, being on the EAC the last five  
13 years, at least this part of the DOE we are  
14 interfacing with is very technology oriented, it's  
15 very engineering oriented, and I understand that.  
16 But I think it -- I find it -- I find as if we are  
17 always having one-half of the conversation in this  
18 room, and I think the -- so it's great to put up  
19 the PowerPoint slides that sort of show how things  
20 are going to work harmoniously together, and we  
21 are going to be able to garner all of these  
22 efficiencies; but I always find myself wondering:

1 Well, okay, so how is it going to happen? How are  
2 we going to make this happen?

3 Because it has to be paid for, and the  
4 people who authorize these payments sit in two  
5 different places, and there's all this dramatic  
6 change going on. So I think, from my perspective,  
7 you know, will the DOE just sort of step back and  
8 paint in some of that picture without necessarily  
9 prescribing solutions, but just sort of point out  
10 that we are not going to just arrive at this  
11 future. It's going to require some harmonization,  
12 they are going to need alignment between state and  
13 federal policies, et cetera. I think that could  
14 be incredibly helpful, because I don't think  
15 people understand that big picture.

16 MR. BROWN: I didn't mean for my  
17 question to be critical of what we've been doing  
18 for the last hour-and-a-half by the way. It's,  
19 you are right, that shapes this, but also, I kind  
20 of want to hear the answer to the other. What  
21 would you rather -- What would you like to have?  
22 And then we can figure out whether you can do it

1 or not.

2 MR. VAN WELIE: So, Rich, shall I wrap  
3 this up?

4 CHAIRMAN COWART: Yes. Let's wrap this  
5 one up.

6 MR. VAN WELIE: I'd like to thank the  
7 panel, thank you so much for making it, for you to  
8 come out here.

9 (Applause)

10 CHAIRMAN COWART: So we've had two  
11 really, mind expanding panels, in these meetings,  
12 I appreciate everybody's -- I appreciate the  
13 panelists and the commentary and questions from  
14 the EAC. It's been terrific. We have one final  
15 report from Carl.

16 MR. ZICHELLA: Can I do it from here?  
17 Okay. I think I'll probably just do it from here  
18 so I can see the slides more easily. And this is  
19 a report on the Clean Power Plan Working Group.  
20 It's quite a -- as we are teeing that up -- quite  
21 a large group of folks have been attending the  
22 calls on this, and we've been struggling -- If you

1 can just move to the first slide, please? Oh,  
2 here we go. Great.

3 We've been struggling a little bit about  
4 how to approach this because of the uncertainty.  
5 Obviously there's tons of it, and we have had the  
6 implementation to ways that we've known from most  
7 recently the Supreme Courts stay. The state  
8 approaches are unclear how people are going to  
9 approach it. We've talked a little bit earlier  
10 about mass versus rate approaches, and whether  
11 states will go it alone, or collaborate.

12 We, as a result, we didn't feel ready to  
13 put a product together to recommend to DOE how to  
14 proceed. But I thought it was worth trying to  
15 understand what was being done and how well it was  
16 being coordinated.

17 The next slide, please? So, as we  
18 looked across what was trying to understand was  
19 being doing, one of the things that did lead --  
20 that lead out to us, was that modeling assistance  
21 is likely to be very necessary, because there's  
22 varying capabilities between states. And among

1       them, the differences of various approaches, that  
2       would I just mentioned, and the need to have  
3       consistent methodologies to identify compliance  
4       and approaches, and to track the effectiveness of  
5       the states' actions; and also the role of markets  
6       with regard to compliance.

7               The next slide? So, we realize the DOE  
8       is already working on a lot of these things, and  
9       we had somewhat of an imperfect knowledge about  
10      what the organization is doing and looking at.  
11      So, one of the things we decided to do is to  
12      request a series of webinars with DOE staff, to go  
13      over a series of topics we identified, so that we  
14      could better understand where there may be gaps.  
15      And we came up with a list of topics that we want  
16      to propose to DOE, that our working group have a  
17      set of webinars about.

18             The next slide, please? In the interest  
19      of time I'm not going to -- I'm going to read  
20      through these, or skip through these fairly  
21      quickly. We realize we may have to combine some  
22      of these. The first is a gap in the analysis on

1 the models, who is doing what? Has DOE inventory  
2 the efforts that are going on around the country?  
3 Are there gaps in what's being done? How should  
4 we be focusing our efforts on modeling, in  
5 particular? Amongst the different models, how do  
6 we make sure people can get access to them? Many  
7 are -- or some of them anyway may be proprietary,  
8 some of them may not be open source. There is a  
9 real need to be able to come up with something  
10 that many of the states are going to be challenged  
11 to do some of this work can't get access to it.

12 Also the status of coordination between  
13 the various agencies, EPA, DOE, FERC, what kind of  
14 guidance is EPA providing about their needs for  
15 modeling? Just getting a better understanding of  
16 that level of coordination, recognizing that it's  
17 happening, but not really understanding the depth  
18 of it; how do we go about that? A really  
19 important component that came up from our  
20 colleague, Tom, from Kansas was, what's the  
21 strategy in outreach in the states? How do we  
22 make sure they know once there are resources

1 available, that they can get access to them? So,  
2 having some understanding about the outreach  
3 strategy would probably be good too, and if there  
4 isn't one and there's a recommendation for us.

5           The next slide, please? Climate risk  
6 analysis; is there an evaluation of the risk to  
7 plants due to climate change, generating plants,  
8 drought, sea-level rise, extreme heat events.  
9 Those are topics that we are interested in seeing  
10 if there's work being done on. What DOE or  
11 related work is being done on transmission  
12 analysis, and by whom? Are we able to get access  
13 from remote areas to load centers to facilitate  
14 compliance?

15           And there are a number of other  
16 activities around the country that have been  
17 related to DOE work with regard to resource  
18 zoning, and transmission that would be worthy of  
19 exploration in terms of trying to plug that  
20 information into what we are doing. Also, what is  
21 DOE doing on studying ways around markets, as part  
22 of the compliance plan in modeling? I think this

1 is a great interest around the country and  
2 especially as states look at working together on  
3 compliance plans; this is going to be an important  
4 topic.

5 The next slide, please? Okay. The  
6 distribution side that we spent so much time  
7 talking about in this meeting, we would like to  
8 know more about the work on factoring in the  
9 distribution side of energy efficiency and demand  
10 response. Is this a part of lab call, who is on  
11 point for it, I think we did hear a bit about  
12 that, but not necessarily in relation to the clean  
13 power plan.

14 Rate design is another topic. How that  
15 might be factored into clean power plan work. And  
16 is anyone modeling the best ways for states to get  
17 to longer-term goals, say, 2050 or beyond, we are  
18 at risk of creating a compliance strategy that  
19 really fosters a heavy investment in gas plants.  
20 Is that the best strategy for us going forward  
21 when we are looking at having to meet much more  
22 aggressive longer-term goals, by the middle of the

1 century?

2 Now that's a question I think that's  
3 particularly relevant because we can get ourselves  
4 on a trajectory that makes the second tranche of  
5 our work much more difficult.

6 The next slide? So, we took the step  
7 trying to rank these topics so we can have a  
8 conversation with DOE about how to order the  
9 webinars, and what sequence we try to take them  
10 in. And we try to do this by email, and I take  
11 responsibility for that, it was a bad decision,  
12 because we weren't able to come up with the  
13 conclusive consensus about how to rank those. We  
14 need to discuss that a little bit further, to see  
15 about consolidating some of these topics because I  
16 do think there is some overlap, and prioritizing  
17 the ones that I think we are going to want to try  
18 to do with DOE first.

19 I do think there is strong agreement  
20 about the importance of getting our arms around  
21 the modeling questions, so that's likely to be one  
22 of the earliest webinars we request.

1                   The next slide? So we are going to be  
2                   -- Our next steps will be to review the topics  
3                   again, confer with DOE on the availability and  
4                   schedule for webinars and calls. After that we'll  
5                   look at reviewing and summarizing our lessons from  
6                   the calls, and from this process come up with  
7                   recommendations for DOE. I put September meeting  
8                   with a question mark, because it's very unclear to  
9                   me, there's not a big rush right now to do this,  
10                  and there is an opportunity for us to suss this  
11                  out, so it may or may not be something we would be  
12                  willing to tee up by September, but that is  
13                  something I think we can shoot for, I think.

14                  We should be able to do some of this  
15                  work, or most of this work prior to the September  
16                  meeting. We may not be able to come up with our  
17                  recommendations by then, but we should certainly  
18                  have been -- completed our fact-finding, if you  
19                  will. I believe that's it. Next slide? Yes.  
20                  That's it.

21                  CHAIRMAN COWART: Any questions for  
22                  Carl? Thanks for an efficient report. And

1 clearly there's a lot of work going on there.

2 Anything further?

3 MS. HOFFMAN: Just looking at this, off  
4 the top of my head and we'll go back to our group,  
5 but I think there are some things that we can  
6 easily provide information to the Committee on.  
7 You know, the existing market is going on in  
8 climate risk analysis. I think the modeling  
9 question we should, you know, first look at what  
10 the ISOs and RTOs are looking at with respect to  
11 the modeling work they are doing, because they are  
12 closest to some of the decisions that are being  
13 made, so that we don't have to get in a whole  
14 belly of generic modeling that's occurring, more  
15 than try to look at some of the modeling that's  
16 actually occurring at the ISOs.

17 With respect to some of the comments on  
18 energy efficiency, I think if we want to -- if the  
19 Committee wants to look at the value of energy  
20 efficiency, moving forward the power plan or the,  
21 you know, the climate efforts, we should be  
22 looking at energy efficiency, and yes, it does

1 contribute but it's not the sole reason that the  
2 department is working on energy efficiency. And  
3 so we've got to recognize that there's a broader  
4 set of, you know, needs and objective that the  
5 department is going after with the things that we  
6 are working on. So, I just want to put that  
7 comment out there. But I think there are things  
8 that we can move forward out of your list, and  
9 then we'll figure it out from there.

10 MR. ZICHELLA: Thanks. You know, these  
11 things came up in our conversations, mainly in  
12 this context, between power plan, but your point  
13 on energy efficiency is well taken.

14 CHAIRMAN COWART: All right. Any  
15 further discussion? I'd like to close simply by  
16 thanking, once again, Gordon and Paul for putting  
17 together the panels for this session. A lively  
18 discussion, and thought-provoking suggestions came  
19 forward. And with that I think this meeting has  
20 come to a close.

21 MS. HOFFMAN: I'd just like to thank  
22 everybody for hanging out there -- hanging in here

1 'til the end.

2 CHAIRMAN COWART: We are adjourned.

3 Thanks very much.

4 (Whereupon at 12:27 p.m.

5 PROCEEDINGS were adjourned.)

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CERTIFICATE OF NOTARY PUBLIC

COMMONWEALTH OF VIRGINIA

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

(Signature and Seal on File)  
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