BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

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IN THE MATTER OF: :

INTEGRATING RENEWABLE RESOURCES : Docket Number

INTO THE WHOLESALE ELECTRIC GRID : AD09-4-000

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Hearing Room 2C

Federal Energy Regulatory Commission

888 First Street, N.E.

Washington, D. C. 20426

Monday, March 2, 2009

The above-entitled matter came on for conference, pursuant to Commission Order, at 9:00 a.m.

APPEARANCES:

COMMISSIONERS PRESENT:

ACTING CHAIRMAN JON WELLINGHOFF (presiding)

COMMISSIONER SUEDEEN G. KELLY

COMMISSIONER MARC SPITZER

COMMISSIONER PHILIP MOELLER

P R O C E E D I N G S

(9:00 a.m.)

ACTING CHAIRMAN WELLINGHOFF: Well, I really didn't know what to expect this morning when I came into the room with the weather. I thought maybe it would be that we have some of these hardy Midwesterners here who made it through the snow. That's good, although I understand the Claire Moeller didn't make it, so I'm disappointed with that.

So we may have not the full panel that we anticipated, but we are going to go ahead. We're going to find out how many people have made it, and we'll try to do a head count now. But we are going to go ahead certainly with the first group.

This, of course, is the time and place noticed for our workshop on Integrating Renewable Resources Into the Wholesale Electric Grid. We are going to proceed this way. I'm going to make an initial opening statement, and we'll allow my colleagues to make opening statements as well.

Then we'll hear from Ray Palmer, who will give us the procedure for this morning, and then we'll move to our first panel. But prior to doing that, I would like to welcome a fellow commissioner, Lauren Azar from Wisconsin, and do we have Commissioner Schriber from Ohio with us? He was supposed to make it this morning as well.

I'd also like to recognize Congresswoman Tammy Baldwin. Congresswoman Baldwin? Thank you very much for attending this. I'm very honored to have you here.

Good morning everyone, and thank you for overcoming our weather this morning. I welcome you all to FERC. FERC anticipates significant additions to wind generation, as well as generation from other variable resources.

This is driven in part by state renewable portfolio standards and by national tax and energy policies. Renewable energy resources such as wind, solar and geothermal are often located in economically developed quantities at dispersed sites remote from load centers.

I believe that developing the transmission infrastructure needed to deliver electricity from renewable energy resources is essentially to meeting our national energy goals, such as reducing greenhouse gas emissions, strengthening our national security and revitalizing our economy.

The Commission has taken several steps to facilitate renewable energy projects. Order 890 requires transmission providers to conduct studies requested by stakeholders; to evaluate transmission upgrades needed to connect major new areas of wind generation; take into account the special characteristics of wind resources in

application of certain requirements such as generator imbalance penalties; provide new conditional firm transmission service that allows new generation projects to interconnect to the grid on a conditional or electrical basis, while necessary system upgrades are being constructed.

In March of 2008, FERC provided guidance to RTOs and ISOs on the processing of interconnection queues, responding in part to the backlogs in regions that have attracted significant new renewable energy resources.

I'm interested in hearing from RTO representatives regarding how interconnections are progressing. FERC has also created procedures to incentivize investments in electric transmission, including advanced transmission technologies as defined in EPACT 2005's Section 1223.

Three recent cases have provided incentives to transmission projects designed to move renewable energy from promising production areas to load centers. FERC granted transmission rate increases for PacifiCorp, Energy Gateway, lines to deliver renewable energy to six Western states.

Similarly, FERC granted transmission rate incentives for prairie wind tall grass lines to access wind power in Oklahoma and Kansas. Last month, FERC approved rates for Chinook, Zephyr Lines -- did I say that right,

Chinook -- to move wind power from Montana and Wyoming to the Southwest, adopting a flexible approach to projects to secure financing for emerging transmission.

During the course of today, and additional conferences that will follow, we are addressing how to further unlock the potential of our country's location-constrained renewable energy resources by examining the operational, market and pricing issues related to integrating large volumes of these resources into the national grid, in dispersed and often remote locations.

I look forward to all the comments from all the panelists today. As I indicated, this is, I believe, going to be one in a series of conferences that we'll probably have with respect to this issue. But we'll drill down in a little bit more detail in those following conferences, on issues that we won't have time to address today in the one day that we have. With that, fellow Commissioners? Phil?

COMMISSIONER MOELLER: Thank you, Mr. Chairman. This subject is on my mind because last week, between a speech in LA and a speech in San Francisco, I drove through your old home town, Henderson, Nevada, into the desert, and saw the first or largest solar facility in this country, Solar I, located across the road from the El Dorado Solar project, which is a different technology.

These are relatively location-constrained.

They're about 25 miles outside of Las Vegas. But more importantly, they're located right next to four, what appear to be 230 KV transmission lines. So it wasn't that they were put there randomly; the location of the transmission obviously had a lot to do with their location. Beautiful facilities; I'd recommend that people see them.

The point is today we're talking about challenges of integrating renewable resources, but ultimately it's a great day, because it means that this industry has reached the point where we are seriously dealing with the challenges, and it is a serious industry that we are going to continue to try to improve policies that allow its transmission to be integrated with these resources.

We've done a lot as a Commission, some actions before we arrived, through interconnection policies. We approved the conditional firm concept to get wind into the grid. We've dealt with queue issues, and I think we've done our part to try and enhance transmission investment in this country.

But more needs to be done. I appreciate the work that you've done, Mr. Chairman, as well as the staff and of course our panelists who have come from far and wide to present to us today. I look forward to today. Thank you.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Phil. Suedeen? Suedeen and I have a little jet lag. We both just

got back from China.

COMMISSIONER KELLY: Yes. I ask your indulgence for anything that I say today that doesn't make sense.

(Laughter.)

COMMISSIONER KELLY: In fact, I'd like your indulgence for the whole year.

(Laughter.)

COMMISSIONER KELLY: Well, renewables is the topic of the year, if not the decade, and infrastructure investment needs between now and 2030 are staggering. A recent Brattle Group report estimates that the electric industry will have to invest $298 billion just in transmission, in order to maintain our present levels of reliability.

That's before we even talk about how to get renewables to market. The renewables industry is growing at a break-neck pace. As a fairly reliable proxy, our staff calculates that national installed wind capacity grew at a compound annual rate of growth of 39 percent between 2004 and 2008.

Regulators are always in danger of being several steps behind the industry. In an environment where growth in renewables is this rapid, we as regulators need to follow the issues as closely as we can, and be as up to date as possible.

If we consider transmission issues, planning, siting and cost allocation, to which this first panel is dedicated, the implications of renewable integration are immense. New transmission builds, particularly extra high voltage transmission builds --

(Interruption.)

COMMISSIONER KELLY: Was that my Blackberry?

(Laughter.)

COMMISSIONER KELLY: Thank you for your indulgence. Will affect all participants, as far as I can tell. Everyone has at least one interest in this issue and probably multiple. For states, siting and cost allocation issues would seem to be the largest, and of course there are also economic development issues.

Which states will build the renewable generation, and will all states who want to develop their renewable generation be able to do it and find a market for it? For load-serving entities, cost allocation concerns and the ability to meet to RPS requirements in a timely way are high on their agenda.

What about load-serving entities located in regions without significant renewables? How will they access the acceptable resources? For independent generation, particularly those in RTOs, what does it mean for the continuity of their business model?

For RTOs themselves, they have reliability obligations, planning obligations and planning concerns. Finally for the consumers and the ratepayers, ultimately their bills will reflect the results of the national effort to integrate renewables into our energy mix.

It is important that we collectively manage the integration and the associated transmission buildout, so that public support for these vital efforts is not diminished or lost. So I thank all of you who came from far and wide and braved the snowstorms of Washington, D.C. to be here today, and I look forward to your comments.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Suedeen. Mark?

COMMISSIONER SPITZER: Thank you, Mr. Chairman. I too appreciate the attendance of all those. We've got really all-star panels, and I know it's difficult, particularly with the weather, to come to Washington.

Nick Brown tells me he came from Tucson, Arizona, where my in-laws told me it was in the 80's and sunny. I appreciate Commissioner Moeller's, one of the Arizona connection, reference to solar, because solar's an important resource and obviously we're considering a great magnitude of wind interconnection.

But we're looking at all renewable resources, and this is, as my colleagues pointed out, the FERC has

recognized changes in public perceptions and state RPS standards, in terms of reacting and changing policies.

That's a good thing. That's an example of government working. If you consider the history of renewables, I was working on solar energy tax legislation in Arizona in the 1990's, and government has done its best to try and keep up with public interest in renewables, and as is often the case, sometimes the public gets out ahead. I think that's true here.

I want to make brief reference to what I perceive as two elephants in the room, and particularly with an outstanding state regulator like Commissioner Azar here, it's important to consider the siting difficulties, the "not in my backyard" issue, which I would distinguish from concern about commonly-understood environmental issues such as air emissions, water emissions, endangered species, antiquities, historic and the like.

Simply the idea that folks do not like transmission and are reluctant, for very legitimate and understandable reasons, to have infrastructure sited in their neighborhoods, as well as the issue of federalism.

Now certainly, as a former legislator and state regulator, I'm extremely responsive to and concerned by state interests. However, given the magnitude of the challenges we face and the great interest in resolving the

climate debate favorably and successfully, it's my hope that there be a partnership between the states and the federal government.

Notwithstanding there are lots of folks who are impatient and want to move forward, and this presents a great challenge given the varying interests among the states. You have the export states, you have the import states. You have the passthrough states.

How are we going to surmount these challenges in a way that give due recognition to the interests of the states, and the fact that state leaders are in fact elected to represent a constituency within a state or within a district within a state.

This presents a great challenge to moving forward with the dispatch that many people want. So it is my hope that the frustration and perhaps impatience of some of those who want faster deployment of renewable resources will be heard and understood by those in the states, and those in the states will respond accordingly.

I'm an optimist, but obviously with this panel, we hope to really, as Chairman Wellinghoff said, drill down and find some answers to these difficult questions. Thank you, Mr. Chairman.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Commissioner Spitzer. Now we'll turn to Ray Palmer, who's

head of our Energy Innovation sector, to kind of give us the procedure for today. Ray?

MR. PALMER: Mr. Chairman, I wanted to mention that we do have a clock, which we'll use for the speakers and subsequent panels. But the clock does not apply to our keynote remarks from Commissioner Azar and Mr. Sergel.

The other panels, we have the clock and it is set for five minutes. It will count down. There's a change in color when it gets to one minute, and then when it gets to zero, it starts flashing and going negative and whatever.

So this is just for the, you know, the convenience and help for the speakers who will be on subsequent panels.

We do not have a break scheduled this morning because of this very busy schedule today. So I will tell members of the audience that there are rest rooms located by the elevator banks back behind the elevators on both sides of this Commission room.

There is a lunch room down the hall, and please recall that we don't allow food or drink into the Commission meeting room. At lunch time, there will be a lunch for the speakers upstairs, and we have -- they will be escorted by FERC staff up to the Commissioners' library.

I think that covers pretty much the basic administrative items.

ACTING CHAIRMAN WELLINGHOFF: Thank you very much, Ray. With that, we'll start with our keynote panel. I'd like to introduce Commissioner Lauren Azar, who's a commissioner on the Wisconsin Public Service Commission, and also the president of the Organization of MISO States, and Rick Sergel, who's the president of NERC. Lauren?

COMMISSIONER AZAR: Thank you, Mr. Chairman and Commissioners. Good morning. First of all, OMS would like to thank the invitation to come and speak to you on what is turning out to be one of the most critical issues before us right now.

As with all controversial talks, I'm going to begin with a disclaimer. My oral comments this morning as well as my written comments are those of the OMS Board. They are not my personal comments, nor are they the comments of the Wisconsin Public Service Commission.

This morning, what I'd like to do is talk about regional planning primarily. I'll talk about cost allocation, and then finally I'm going to talk very briefly about the OMS initiative on cost allocation and regional planning, that we affectionately refer to as CARP. So if you hear me reference a fish, that is what I am talking about.

So regional planning for renewables and how to integrate them into the grid. Before we talk about the

solutions there and the role states can play, I'd like first to talk about what the problem is.

Obviously, as Mr. Chairman had talked about, one of the challenges with regards to renewables is they are oftentimes geographically located far from load. They're variable and non-dispatchable, for the most part when we're talking about wind, which is what a lot of folks are looking at. Obviously solar is up and coming as well.

But at OMS, we don't necessarily believe the challenge is just about renewables. We are looking at, at least we keep reading about the fact that the federal government may indeed be implementing a carbon cap and trade system or some other type of carbon constraint.

How much reduction of carbon and by when is a mystery to us, but to plan for one type of fuel source or generation type and not recognize the other elephant in the room we believe might be short-sighted, given the amount of dollars that we're going to be spending.

Complying with the RPS is daunting, but complying with significant reductions in carbon will require nothing less than a complete transformation of the electric industry.

Given the enormity of the required changes waiting for certainty regarding a national RPS or carbon limits may be short-sighted. So it's in our best interest

to act now, even in the face of uncertainties.

So how do we address the challenge of RPS and carbon constraints? Not surprisingly and probably music to your ears, we do believe regional planning is the solution. Individual utilities cannot address the RPS requirements or carbon constraint requirements by just looking in their own service territories.

Indeed, there are very few states that will be able to address the RPS and carbon constraints by looking within their own state boundaries. It's only going to be by looking at a larger footprint that we're going to be able to cost effectively address this challenge.

It's going to allow the states to take advantage not only of economies of scale, but also the diversity of resources that we find in this great nation.

So if regional planning's the solution, how come we haven't been doing it all that well so far? I can identify many difficulties, but I want to talk about two difficulties this morning.

The first difficulty, of course, is it's the regional aspect of regional planning that makes it difficult.

(Laughter.)

COMMISSIONER AZAR: Mainly by, you know, historically, electricity planning, you know, generation

planning, resource planning, transmission planning, has been a guarded state right. It's very difficult for states to let go of that.

I can think of many reasons why, including economic development reasons. I mean it's scary to give somebody else the control over something that could have tremendous impact on the economic development and the budgets in your state.

Also, another difficulty with regards to the fact that it's a multi-state effort is that there's heterogeneity in relation to state resources, as well as existing transmission assets and the need for future transmission assets.

If we all had the same kind of resources and we all had the same transmission infrastructure and we all needed the same kind of transmission infrastructure, it would be easy. But we don't.

So we're all coming to the table to negotiate this with very, very different cards to play, so to speak. So that makes it difficult, and you know, the states need to have trust that everybody at the table is wanting a fair and equitable result for everybody, and doesn't just want to maximize what is best for their own state.

Because if we get a state that wants to maximize what is best for their own state at other people's expense,

we have problems with negotiations, not surprisingly.

The second problem with regards to regional planning and one of the difficulties for us right now in the negotiations has to do with the uncertainties that we're facing. There are three, at least three uncertainties. One is of course the renewable requirements. We have existing RPSs, but we're hearing lots about the federal government may be instituting a national RPS.

Secondly, of course, the carbon constraints. We don't know what the emission levels will be or, you know, what the time frames for enacting those limits will be. Lastly, a possible change in the federal role in transmission siting and planning.

So all of those are uncertain to us. We're hearing things about them. The uncertainty itself creates difficulties, because it precludes, it eliminates a steady foundation on which we can negotiate.

Consensus often requires compromise on everybody's part, and compromise is easier when we are working from a steady foundation. In short, the more certainty the federal government can provide regarding renewables, carbon or any changes in federal rules, the easier our regional planning efforts will be.

Again, but that doesn't mean we shouldn't be trying to do regional planning right now. Given the

enormity of the changes that are before us, we can't wait for that certainty. So all I can do is say please, please, please, give us that if you can.

Also, I'd just like to talk about what constitutes regional planning. This has been a bit of a debate in the OMS, as well as I understand elsewhere. I want to talk about two general areas.

One is should regional planning only capture transmission planning, or should it also capture resources as well as potentially dramatic changes in the distribution system relating to SmartGrid?

You know, just the title of this technical conference indicates that you all have embraced the bringing of the resources and the transmission together.

Just to let you know that not everybody has so embraced that, and OMS, in our most recent meeting, has agreed that we should be including not only the resources but transmission as well as distribution aspects in our regional plan. So we're there, but other folks may not be.

And also, probably an even bigger issue is how does one approach regional planning? Does one take the transmission owner's plans and compile them and eliminate redundancies, or do you initially ignore transmission owner service territories and state boundaries, and try to, I'm going to use the word "optimize," even though it's not quite

right, but optimize the resources in the region?

I like in the former the collection of the TO plans to painting by numbers, right. You're connecting the dots and you're painting in this canvas that already has numbers in it.

Versus the other is starting with a blank canvas and creating a painting that actually optimizes what's before you. I think you can probably tell by my description, which I think is a better way to go about it.

At our most recent meeting at OMS, we did decide to tend towards the more blank canvas approach, provided that the reliability concerns of the individual TOs would indeed be captured in that approach. So not completely eliminating the TO approach, but I think starting with a blank canvas and making sure that the TO concerns are captured.

So who should do regional planning? Not surprisingly, OMS believes that the states should do regional planning, and we think hat we are uniquely situated to do that for a number of reasons.

To tick a few off, one, you know, the buck stops with us with regards to retail electric rates. Any of the improvements that are going to be done with regards to the transmission system and creating renewables or lower carbon-free generation will hit our rates.

So we have to talk to the people in the supermarket about these things, and would prefer to have made the decision.

The second is siting is inherently local, and Commissioner Spitzer mentioned some of the downsides of having siting being inherently local. But I would like to point to the upsides of being inherently local, is that the more local the decision-maker, I think the more legitimate the decision is perceived by the community.

You obviously need to have local decision-makers that are willing to make the hard decisions. But if you do indeed have local decision-makers, again in the grocery store you're more likely to be able to explain why this decision is legitimate.

Also, there are state-specific issues that should be included in regional plans, such as unique natural resources and the special needs of the state loads. In sum, regional planning will likely be the most cost-effective method of integrating renewables into the wholesale grid, and the states are uniquely situated to accomplish this task.

Now I'd like to talk just briefly about cost allocation, because it is -- it's inherently intertwined with the regional planning efforts. If you don't crack the cost allocation nut, I don't know if you're going to crack

the regional planning nut.

OMS targeted cost allocation as one of its top priorities in 2009. We will be reviewing both Reg B-1 and Reg B-2 this year. In an informal survey, every OMS member agreed that the cost causer and beneficiary analyses should be at least in part of the calculus of who should pay.

However, during our first meeting, we are unable to reach agreement on how to define beneficiary. So I'm assuming we're going to -- I know we're going to be coming back to that issue and we'll obviously have to drill down and answer that question.

Given that it is early in the CARP process, it's unclear whether OMS will remain -- will want to remain with the Reg B-1 and Reg B-2 methodologies, or whether we will be proposing a wholly new approach to how to pay for the transmission grid.

The one thing that is certain is OMS's commitment to reaching a consensus, or near-consensus on cost allocation.

Now let me just briefly talk about our favorite fish, CARP. As indicated, OMS' two top priorities for 2009 are regional planning and cost allocation. MISO has started a Reg B task force to also take a look at the Reg B methodologies.

OMS decided that it would seek a leadership

position on that, and what we've done is we have now started a series of commissioner-led meetings that we hope to work iteratively -- God, and I haven't gone to China, so I don't have that excuse -- iteratively with the Reg B task force.

Whereas OMS will be thinking about regional planning on a regulator level, asking the stakeholders on the Reg B task force for information and bringing it back, using that information, and then ultimately the OMS group hopes to come up with a draft proposal on cost allocation to send to the Reg B task force for comment.

And my sense is we have our first meeting at the Reg B task force. My sense is the stakeholders are comfortable with that approach, because they know that the state regulators are one of the primary forces behind cost allocation and they certainly want to know that the state regulators are comfortable with cost allocation methodologies when we go forward with them.

In conclusion, OMS looks forward to working with MISO and FERC in how to figure this out. Failure is not an option, and we need to figure out how to, you know, connect up our renewables and frankly connect up low carbon and carbon-free generation. I think that can only be done over a large footprint. Thank you.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Commissioner Azar. Rick Sergel. Rick?

MR. SERGEL: Good morning and thank you all for the opportunity to help kick off today's important technical conference on integrating renewable resources.

FERC's technical conference series bring together the best and the brightest in their fields, and today is no exception. You're to be congratulated. But let's get right down to business.

According to data submitted to us by system planners in North America, 145,000 megawatts of wind generation is proposed to be added to the grid over the next ten years. I believe that central station solar cannot be far behind, and I have talked to them about making sure that they similarly include their information in our reports.

Now not all of these projects will be completed. But notwithstanding, it's clear that the need to integrate renewable resources is no longer a question; it's a priority. Accomplishing this goal will fundamentally change the bulk power system the way we plan, the way we operate, the way we think.

Changing our industry must be approached cautiously. Collectively, the industry owns and operates the assets that keep North America running, and any change made to the system that results in a blackout will not have been a good one, right? So we have to do this very carefully.

But I do submit to you today that we're in need of change. Supply and demand have outpaced transmission development three to one over the past 20 years, leaving the grid operating closer to the edge than in the past.

An increased reliance on natural gas has raised significant concerns about the availability and deliverability of this critical fuel for the future, if we do not have a diversified electricity supply portfolio.

While I believe base load nuclear and coal are needed, new nuclear plants will require substantial time to be built once approved, and advanced coal technology needs time to mature.

I think while we won't talk more about it today, cybersecurity is a growing threat, which we must address. Innovations in refueling the transportation sector with plug-in hybrid electric vehicles will rely on the electric grid to supply the energy they need.

So the challenge for all of us today is to commit ourselves to focusing on the solutions to these issues, not the challenges themselves. We've successfully integrated new resources like nuclear in the past, and I'm certain that we can do it again.

But first a few critical points. We absolutely need the transmission. We estimates tens of thousands of miles of new transmission is needed to unlock these

location-constrained energy resources and to maintain reliability. That transmission will be required, whether it is with renewables, whether it is nuclear, whether it is clean coal. The mere fact that we are changing the generation locations will require new transmission.

Now building it will require us to address the barriers that have prevented adequate transmission development over the past 20 years, and I'll try to do this very carefully.

But by state by state planning for, and I think that was described very nicely by Commissioner Azar's paint by numbers, right, which I will steal and use, along with the approval of siting and cost allocation for high voltage, multi-state transmission lines, right, doing that state by state is not sufficient.

Now addressing these two elements will have a positive implication for regional planning. First attempts are out there. The work of WECC and the Western Governors Association and the joint coordinated system plan in the east show the industry is both willing and capable of developing interconnection-wide plans and working with the states to do so.

It's also clear that demand-side options like energy efficiency and particularly demand response have a critical role to play in managing overall energy consumption

and acting as a dancing partner for variable generation.

Beyond energy independence, plug-in hybrid electric vehicles offer a great opportunity for storage, creating grid resources and shifting peak usage. But to realize these potential benefits, we must build a smarter grid.

And still, even with energy efficiency, a full portfolio of resources will be needed to support the development of variable generation. We will still need base load options to keep the lights on. Today, base load options are primarily nuclear and coal.

We simply cannot turn our back on these needed resources. We must also overcome a number of operational issues associated with variable generation, and over the past 12 months, NERC has worked with a team of industry experts, forming the integration of variable generation task force, to assess what will be needed to integrate large-scale variable resources.

The report is not due out until later this month, but a one sentence summary will do for today. We've got work to do, okay. While it's easy for me to stand at this podium and talk about what needs to be done, keep in mind it's taken them months to write it and it will take them years to act upon it.

Again, the report will speak for itself when

issued. But for today, let me give you my comments. Forecasting must be improved, and incorporated into day-to-day operational planning to successfully address wind and solar ramping issues, adding an entirely new discipline for system operators to master.

Variability is much less of an issue, as long as it's predictable, and our industry already deals with variability and demand fluctuations. The only difference is we've gotten very good at figuring it out when it comes to load.

We must then account for this uncertainty and variability in our system design, adding more flexibility into the system to support greater differentials between load and available supply. Demand side option is one of the greatest solutions to these issues, and we are already making great progress and need to continue these efforts.

Another way to expand the flexibility of the grid may require changing how the grid is structured. Larger balancing area or wide area agreements between balancing areas will provide operators greater access to ancillary services and resources like demand response, which will help to soften wind sharp ramps and manage its ripples.

There will undoubtedly be unexpected consequences to this restructuring and mitigating these efforts will require industry-wide study and modeling efforts.

We also need a consistent method of accounting for peak availability of these resources. Today, there are three primary methods used to calculate wind capacity on peak. We would be much better off if we had one, and we need to test it, analyze our results and improve it.

Lastly we, and specifically NERC, need to review our standards, to ensure that requirements such as voltage support and fault ride-through can be consistently applied to all resources linked to the grid.

Now driving all of these to completion is a difficult task. A strained workforce and growing loss of expertise will make this even harder. But if any industry knows how to meet this challenge, it's ours. Restoration crews, some from thousands of miles away, worked tirelessly for months to restore power after a major storm. Undoubtedly they are out there working today with the snow in the East.

Planners pull together to create continental plans, and every day operators coordinate to run the largest machine in the world, carrying electricity across states, provinces, regions and international borders.

Today, 1,800 registered entities are striving to instill a culture of compliance in their organization, after the industry worked so hard to impose mandatory reliability standards on itself. So we can do this job and we look

forward to doing it together.

All of us in this room have the unique opportunity to lead and the responsibility to succeed. Thank you very much.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Rick. I appreciate it. Well, if we want to get back on time, we can take ten minutes for questions. But I think we have a little more time, because I think our next panel is not all here.

I don't see everybody that's on the next panel in the audience. So why don't we proceed? Commissioners, questions? Sue?

COMMISSIONER KELLY: Lauren, how much time do you think the states need, or particularly like the Organization of MISO States, to develop the regional plan for delivery of renewables?

Do you see it as a -- I'm speaking from my experience with the Western Renewable Energy Zone initiative. Commissioner Moeller and I are on the Steering Committee of that effort. Arguably, that's a little more manageable, since the Western Interconnect is one group.

And the process is taking a while, not surprisingly. I don't think it's taking too long. It's just a big challenge. So when you think into the future about regional planning, do you see it as coming up with a

big plan, one?

Or do you see it as something that evolves over time and there's a plan this year and it changes next year?

COMMISSIONER AZAR: I think there are two answers to that question. The plan that we're doing right now is actually we've combined our cost allocation and regional planning efforts. So it's a way for us to talk about cost allocation. It's going to be an indicative regional plan, which will essentially give us one way to answer the question on how to remove the renewables, and you know, the other types of generation that we have. It's not going to be an engineering plan.

So that's what we're working on right now. I think that can happen relatively quickly, and given the fact that we see some looming threats with regards to maybe losing our ability to do that in the future, we're trying to work very quickly to get this done.

I would expect having something along those lines, i.e., an indicative plan on cost allocation by the end of the year.

To answer your question with regards to real regional plans, on ones that can be actually implemented, I think that is going to take a longer time. I don't think there's going to be one plan. You know, we don't. There

are too many uncertainties right now to actually come up with one plan.

What we can do is come up with plans that would allow for mid-course corrections, so that once we do know what the renewable, the RPF is going to be, we do know what the carbon constraints are going to be, we're going to have a better idea as to how to do it.

Even once we know that, you're going to want a plan that will allow for mid-course corrections. So I don't think you're going to have a static plan. I think it's going to change over time, but you know, you're of course going to be able to -- that doesn't mean you're not going to be able to build things now. You can.

It's just what you build now, you want to make sure it's not precluding you from taking advantage of opportunities in the future.

COMMISSIONER KELLY: Thank you, and I would like this opportunity to say for the record that I agree with you 100 percent that the best and most effective plans are plans that are developed locally. So thank you for being willing to take that on.

Rick, when you talk about the forecasting that must be improved to better integrate variable generation, does that technology exist, and we just haven't integrated it and we could with SmartGrid and through the demonstration

funds perhaps? Or does that technology still have to be developed?

MR. SERGEL: In my own experience, I would say it probably does exist. It's just a matter of transferring that information from the Weather Service to a system operator and doing that in a logical and consistent way. Whether that requires some technology or not, I wouldn't know.

When I started with Florida Power and Light, we predicted weather, the loads by which side of the building the pigeons sat on, because it told you which way the wind was blowing. Once you knew which way the wind was blowing, you could tell whether the temperature was going to be higher or lower. Not very sophisticated.

Today obviously, we've come a long, long way from those days. But I do think the information is there. I don't believe this is something that requires more than just transferring that knowledge from what are sophisticated weather forecasting services into the system operator, so they could use that information, and then know how to use it and how to better control variable resources.

COMMISSIONER KELLY: Thank you, and then a second question. I appreciated your comment about how important it is to look at broader areas for integrating renewables and dispatch. Has NERC looked scientifically at that? Is that

a task that you're undertaking to look at this point optimal areas for integration?

I assume that on the one hand, the areas might be too small and could be enlarged. I don't know if on the other hand they can ever be too big and need to be made smaller.

MR. SERGEL: Well, I think that that is work that remains to be done. So I think the task force is still thinking about that. They haven't issued their report. I'll be interested myself in exactly where they come out on that issue.

It doesn't necessarily require a larger balancing authority itself, but it does require having some sort of relationship with those that are around that balancing authority, to sort of stiffen the structures, such that they can better withstand the variability that they would receive from these resources.

I would suspect there's a matter, a significant amount of work, though, that needs to be done, to determine exactly how to do that.

COMMISSIONER KELLY: When you say "stiffen the structures," do you mean physical or contractual or both?

MR. SERGEL: It would undoubtedly be both, but if you had a -- if you attempted to put a very large amount of wind into a very small balancing authority that's required

to then balance to both the load to the generation instantaneously and to do that at all times, that becomes very, very challenging for them.

Now how do you do better? Well, you physically make it stronger through transmission, and you can also make it better by having operating agreements with your neighbors. So it would be both.

COMMISSIONER KELLY: Thank you.

ACTING CHAIRMAN WELLINGHOFF: Phil?

COMMISSIONER MOELLER: Thank you, Mr. Chairman. Laura, I have kind of a two-part observation. I guess I'd like your response to it.

The first is that regional planning, as it currently exists, is highly dependent on the leadership from the individual states and commissions. You and your governor have been leaders, along with the governors and the commissions from the four other Upper Midwest states, the Dakotas, Iowa and Minnesota.

In another sense, Wisconsin has been a leader, because the state decided a few years ago we're in crisis in terms of a lack of transmission. We're going to create an entity that basically just focuses on building transmission. Consequently, a lot has been built in a relatively short amount of time.

My concern being that these kind of -- without

more of a federal role, we're just -- we're dependent on the individual leadership and that's a chain where a weak link can kind of break the progress. I guess I'd like your observations on that, and specific to what you've done in Wisconsin.

COMMISSIONER AZAR: You know, with regards to a potential weak link, let me just say that I think the states can get this done, provided that we had a steady foundation on which to negotiate.

Let me just give an example. If for instance, we all did know that the federal government was going to come in and do it for us, if we couldn't get it done within a certain time frame, I think just that alone would bring people in and they would be willing to compromise probably more than they would today.

So I don't think the states are unable to do it. It's just we don't know what the parameters are right now, and without those parameters, it makes it difficult.

The second part of your question, would you like me to talk a little bit about the Wisconsin model?

COMMISSIONER MOELLER: Yes.

COMMISSIONER AZAR: Okay. I'd be delighted to. You know, Wisconsin has been able to build quite a lot of transmission since the year 2000, when our stand-alone transmission company was created.

I think that at the end of last year, we were at $3 billion had been spent. I hope I'm getting that right. Somebody from the APC can correct me if I'm wrong.

But they have come up with a methodology in which they are able to site things. Commissioner Spitzer raised the NIMBY issue, which is problematic for everybody. But I really think it's a number of things.

Number one, the transmission company is very good at going out and educating the public where the lines are going to be. The process is transparent. They treat the folks that are on the alternate routes with dignity and respect, and ultimately when it gets to the Commission, we have to make the hard decisions.

So if you don't have regulators that are willing to say "I'm sorry, Mr. and Mrs. so and so, you are going to be bearing an extra burden for our society. We're going to pay you for it, but you're going to be bearing an extra burden."

You've got to be able to look them in the eyes and say that. Assuming that you've got all those things in place, you can get this done. You've got to have thick skin as the regulator, because you know, we do get called names, amongst other things.

COMMISSIONER MOELLER: Well, you've done a good job. I presume the $3 billion has met your cost-benefit

analysis, in terms --

COMMISSIONER AZAR: Absolutely.

COMMISSIONER MOELLER: Thank you. I'm glad you're here. Rick, quickly. I just want to comment that --

I want to commend you for last November, where you highlighted the uncertainty that not only the commissioner mentioned that she's subject to, but we're subject to the uncertainty over what's going to happen with carbon constraints, renewable portfolio standards, and the role that we may or may not have in federal siting.

Your report in November pointed out that there is a risk to reliability, depending on where we go. As I understand it, you really didn't take any heat for that, is that correct?

MR. SERGEL: Well certainly on behalf of the industry, I would say thanks for the comments. We're at our best when we collect the information from the stakeholders, and that's what we did in that report, was we collected the views of those who own and operate the system.

We then brought those together into a single document. There are a lot of -- there's a lot involved in attempting to move forward with respect to what needs to be done in a bulk power system, particularly with transmission, without having that clear policies behind us in terms of

what is going to happen with renewables, or where are we going with nuclear, just to mention two.

I think that's where our challenge comes in. So we're going to continue to try to make sure that we explain, as clearly as we can, the need for strengthening the transmission system as a means of meeting every one of the objectives we have, whether it's climate, energy independence or cybersecurity, all of which require us to invest.

That's the opportunity we have to assure that we continue to do the job that we do today, the industry does a marvelous job today, and we're trying to make sure they're able to continue to do that going forward.

COMMISSIONER MOELLER: Thank you. Thank you.

ACTING CHAIRMAN WELLINGHOFF: Mark?

COMMISSIONER SPITZER: Thank you, Mr. Chairman. What's fascinating is Mr. Sergel's discussion of a number of issues typically associated on the retail side. To me, it makes it very manifest that we can't be successful without the direct cooperation of the states.

You mentioned distributed generation. My notes show twice a mention of plug-ins, storage, demand response. Ten years ago, certainly 20 years ago those issues would not have been associated with reliability coordinator for the bulk system.

So that there is a nexus between the retail side and wholesale reliability that's going to become increasingly manifest. So I guess my question for Lauren, and by the way, when I was in politics, I welcomed aggrieved people at the market, because I was reassured that they cared.

(Laughter.)

COMMISSIONER SPITZER: And in fact, your discussion of Wisconsin, which has been progressive, suggests historical references of my own, that there are always objections to the line as being unnecessary. Where a state has embarked upon demand response and distributed generation, those arguments become untenable.

The opposition is -- there will always be some opposition, but the record then becomes much clearer about the need for the line, when the state has done everything it can to attract alternatives.

In the federal area, in the federal domain, you alluded to the need to know where a basis to negotiate. There's uncertainty as to climate, federal RPS, federal siting. A lot of times folks take the approach with legislation. They want the bill the way they want the bill.

Have you sort of approached, and there's a continuum, I understand, and different states may take different positions and talk, representing a large group.

But are you reaching the position of please decide, as opposed to do we want every I dotted and every T crossed the way we would like it?

Given the urgency, it's more important that finality be resolved, even if the legislation is not entirely to our liking.

COMMISSIONER AZAR: Thank you for the question, and let me clarify something I said earlier as well. OMS has not specifically addressed this issue, as far as do we want a decision now, even if it's not perfect?

When I said earlier that it would be helpful to sort of have certainty, I'm speaking more from the facilitator of the group's position than anything a board has said. So let me be clear that that is not a position that the OMS board has taken a position on.

So I will speak again to you from, you know, as I'm sitting up and leading the group, and watching the dynamics, that I do see how the uncertainty is bubbling up is affecting, potentially affecting our ability to get consensus around things.

You know, we may be able to get consensus, even with the uncertainty. I certainly hope that is the case. Just I wanted to articulate ways in which you could make my job easier, the bottom line.

COMMISSIONER SPITZER: And Rick, from your

perspective, have you found that working with the registered entities under the new reliability regime has improved the communication on those retail issues that you discussed, in a two-way communication?

Obviously, you need to communicate reliability issues in the form of mandates to the registered entities. But how effective has been their feedback back to you?

MR. SERGEL: I think the opportunity to first just know who are the 1,800 users, owners and operators is important. The fact that we can understand carefully what their roles are and that has certainly been one of the very positive benefits of mandatory standards. It helps.

It also provides a forum for us to be constantly communicating with them, in particular, I think, on cybersecurity. While we have a long, long way to go, our ability to now get messages out and responses back is just much better because of the mandatory standards. So it's one of the real value-creating factors from that change in the law.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Mark. Commissioner Azar, I appreciate very much your testimony on the question of what problem are we trying to solve. I think there's too few people who do that. You're one and Mike Davis at PML did that in a meeting I was in.

But I think there's too many people running down

the road, believing that we have to do all these things, but not thinking about what we want to do. So I appreciate that. With that, let me expand a little bit on the question, I think, that you were answering.

That is with respect to planning, if we're looking at planning not just in the MISO region, but we're looking at planning across the whole interconnect, do you have any opinion or does the Organization of MISO States have any opinions on how that should be done?

COMMISSIONER AZAR: I can tell you the Organization of MISO States has not taken that issue up. So I'm venturing into my own territory right now.

ACTING CHAIRMAN WELLINGHOFF: Okay, okay.

COMMISSIONER AZAR: You know, MISO was inherently involved with the preparation of JCSP, which was planning on an eastern interconnection.

Let me say one thing I can tell you the OMS has decided, is we recognize when we -- based on the results of the JCSP, we recognize that it's very possible that folks east and south of us are going to need power that's going to have to come through our footprint, and indeed, are going to try to incorporate lines that would convey that energy.

So it's not as though we're going to be myopic. The reality of it is there's going to be gigawatts going. I think, you know, so far we're just looking at the

renewables, the JCSP.

But if you start looking at coal plants with carbon-captured sequestration, and where nukes are likely to be sited, I think you could see a lot of power coming out of the MISO footprint in the different footprints, and we are not naive about that.

So yes, we will be looking at that. I don't think we necessarily have any position with regards to negotiating with the other RTOs on it. Obviously, I think, some of the RTOs need to decide where they do want to get their renewable as well as low and carbon-free power.

ACTING CHAIRMAN WELLINGHOFF: But if that was our question, the question being when you cross the interconnect, our answer of how to do that planning may be somewhat different than indicated today.

COMMISSIONER AZAR: Yes, I believe it would be. You know, getting the RTOs together to -- let me answer it this way actually. I think with plans like the JCSP, somebody like the OMS could indeed come up with ways in which to convey large quantities of carbon-free and low-carbon power to different RTOs.

I'm thinking of the DC lines, and you know, what we're concerned about is we want to make sure that we're able to accommodate, from a national perspective, the needs of other RTOs. But we want to make sure also that that's

not going to mess up our own system. You know, just looking at the DC line seems to be a good way to do it.

So I think ultimately the RTOs are going to have to get together. The bottom line is I don't think I have an answer for you. Right now, we are looking at ourselves, with the recognition that we're going to have to convey power outside of our own footprint.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Lauren. Rick, do you have any comment on that issue, of how we might do interconnect-wide planning?

MR. SERGEL: A couple of thoughts. First, it's essential and we have to. Along with that, it's obviously being done in Texas, because of the nature of it being a single state, and at a more advanced stage in the West, but not -- but I think still not entirely as interconnection-wide as I would like.

I think it needs to be cross-border and we have to be very respectful of our neighbors in the development of those plans, because -- and I know they try to do that in the West, but that will be necessary in the East as well.

My final thought is I don't see it as a plan, as much as planning. I think that that is -- that would be the key to having an interconnection-wide planning process that could then be extremely useful to all of those who participate in planning, whether it's in a region or in a

commission, in making whatever decisions it has to make with respect to that.

So the idea that there's a single plan for the interconnection is not, in my mind, a requirement. But planning is required.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Rick. Do I have any staff questions? Anything from staff?

(No response.)

ACTING CHAIRMAN WELLINGHOFF: All right. Then I think we can go to our next panel, and Commissioner Azar, if you would join us at the horseshoe here, and you're certainly welcome to ask questions of the following panels.

The next panel we have up is on transmission system planning to enhance integration of renewable energy. We should have Betsy Moler, Claire Moeller I indicated I don't think is --

MR. PALMER: We have a substitute.

ACTING CHAIRMAN WELLINGHOFF: You have a substitute for Claire Moeller. Good. All right. Michael Kormos. Is Michael here? Lisa Barton, Pedro Pizarro, Joseph Welch, Gordon van Welie, Nick Brown. If you'd join us please?

MR. PALMER: Pedro might not have made it from LA.

ACTING CHAIRMAN WELLINGHOFF: Yeah.

(Pause.)

ACTING CHAIRMAN WELLINGHOFF: All right. I think we're all here. We've got Betsy Moler, Executive Vice President for Exelon Corporation; Stephen Kozey, General Counsel of Midwest ISO; Michael Kormos. He is the Senior Vice President of Operations for PJM Interconnect.

Lisa Barton, who's the Vice President of Transmission with AEP. I see that Mr. Pizarro from Southern California Edison, I guess, did not make it from the West Coast.

MR. PALMER: He's on his way.

ACTING CHAIRMAN WELLINGHOFF: He's on his way, okay, good. We'll make sure that he gets his opportunity as well.

Joseph Welch, Chief Executive Officer of ITC Holdings Corporation. Gordon Van Riely, the President and CEO of ISO New England, and Nick Brown, the Chief Executive Officer of the Southwestern Power Pool.

Thank you all very much for being here. A very distinguished panel, and I appreciate you taking your time out on this very snowy morning to share your thoughts with us. Betsy, if you could lead us off please?

MS. MOLER: Thank you very much, Mr. Chairman. It's a pleasure to be back at the Commission. There's a great dialogue going on in our country about the integration

of green resources, be it through a renewable portfolio standard requirement or carbon legislation or whatever.

President Obama, elected officials at all levels of government, corporate citizens and numerous other stakeholders are increasingly advocating the expansion of our nation's electric grid to accommodate green resources.

Exelon applauds these initiatives, and outlines today some of the things that we think will help make that happen.

First, we support passage of federal siting legislation, giving this Commission plenary authority to site all new high voltage transmission, which we would define to mean transmission lines 345 KV and above, and any feeder lines 100 KV and above that connect new, non- or low-emitting resources.

The authority should be based on the Natural Gas Act model for intrastate natural gas pipelines. We would urge the members of this Commission to formally voice your support for such legislation as well.

Even though this Commission does not yet have plenary, that siting authority, we urge you to take steps now to enhance the prospects for siting new transmission. That leads to our second recommendation.

The Commission should immediately require interconnection-wide transmission planning, using economic

planning criteria. In this era of limited capital resources, it is imperative that we build the most efficient system that we can figure out. Planning should not stop at RTO borders or a utility's border or at a state border. We need to look at an integrated, efficient whole.

Plans can be developed locally, but they must be integrated across the interconnection. Flows do not respect local borders, state borders or even national borders, and the reality of the planning needs to recognize that.

Third, the Commission should require interconnection-wide cost allocation for major grid upgrades. Enhancing the nation's transmission infrastructure is a national priority, and the costs should be borne by all load in the interconnection.

Fourth, the Commission should require a competitive process to build the most cost effective transmission system. Utilities and merchant investors should have equal opportunity to finance and build grid enhancements. These concepts are elaborated on in my prepared testimony.

But let me just have you turn, if you will, to the two maps that we see on pages six and seven of the prepared remarks. Those show proposed lines from the Dakotas to Chicago, or the JCSP process, which was -- where they modeled a 20 percent energy scenario.

One of them has a sort of bare bones conceptual proposal, where they have a lot of lines to carry wind from the wind areas in the Dakotas to Chicago.

Well, there's not enough capacity to take the electricity away from Chicago, and we don't really know, under the present regime, whether you should build the lines and enhance the infrastructure going east, or maybe it should go south.

If you look at the more sophisticated JCSP wind energy scenario, you see a much more substantial build-out of the grid. Well which one of these makes sense? It is imperative for us as a country, given the resource constraints that we have, and in the interest of our customers, to figure out which one of those scenarios makes sense.

Without a detailed interconnection-wide plan which receives input from utilities, regulators and customers, there is no way to know which of these scenarios is more cost-effective, or whether there are others that should be considered. Having a well thought-out plan is essential when tens or hundreds of billions of dollars of investment in new infrastructure are at stake.

We would also have interconnection-wide cost allocation, as I indicated, and that's covered to some greater extent in the prepared remarks. Transmission

planning and cost allocation should not stop at the individual utility or RTO borders.

We support legislation and where necessary new rules that incorporate siting, planning and cost allocation for transmission, both to enhance new generation and to enhance reliability of the existing grid.

FERC should begin to take steps now, before legislation is enacted, to encourage interconnection-wide planning processes, and to require that costs for new high voltage transmission be shared by all users. The way that the NERC charges are spread is an example of that kind of cost-sharing. Thank you very much.

ACTING CHAIRMAN WELLINGHOFF: Thank you very much, Betsy. Stephen.

MR. KOZEY: Thank you, Mr. Chairman. Accompanying me today behind me is Mr. Dale Osborne, who's worked with the Commission staff and with DOE. So if it turns out the questions are of a technical nature, I have a feeling Dale might be the person to answer.

Claire presented a few slides that I'd like to talk from in my five minutes. First of all, I'm so thankful that the discussion, unlike sometimes happens here, where there is A, not A and not A anyway no matter how, we're all actually talking so far about the same problem and, Mr. Chairman, arguably even about the nature of the problem

we're trying to solve.

It's not enough to have a plan to integrate renewables; you have to say why or what's your goal for that? Is your goal the maximum reduction of CO2 emission as possible in your region, or is the goal to lead to the lowest economic cost of delivered wholesale energy mixed with the infrastructure, because you'll get different results.

Mr. Sergel said the industry can do things, and somebody asked a question well why haven't we done more in the past? Well wind integration, I think, is the first time the industry's been asked an interconnection-wide question.

In the past, it hasn't been asked a question that big, and you've heard from other witnesses that these questions now are going to involve changed generation, generation in new places going to load which is in its traditional spots.

The Midwest ISO had a chance, because of agreements that this Commission required we reach before we could have market operations, to have coordination agreements with our biggest neighbors, PJM, TVA, SVP and the map region.

Those agreements, which were on file with your Commission before Order 890, had requirements for some joint planning. So the JCSP had its origins in us trying to meet

our obligations to you. We were informed by the Order 890 elements.

Dale has given me information. I believe we had more than a dozen meetings across the Eastern Interconnect, in places such as Charleston, Nashville, Knoxville, Hartford, Connecticut, New Orleans, Dallas, Cincinnati, St. Louis, St. Paul, Delaware and Pittsburgh, with about 70 folks per meeting, with a total of more than 300 participants, that allowed us, in some coordination with DOE, to try to answer that question.

We had shared assumptions, documented assumptions, questions being added to the table and not taken off, a plan not to support some preconceived answer but to develop information.

We took as our reference case just the state RPS mandates that are in existence already, because this problem or issue is not solely whether there's 20 percent wind mandate or not.

The answer to that question is that there's a lot of buildout that is required. A good answer is the reliability guys and our partners at PJM, with those screens, that they're working on some more, say yes, this is an engineeringly feasible solution, as opposed to an infeasible one.

Because of the 20 percent renewable standard

being considered nationally, that was modeled too. As Ms. Moler showed you a map -- and they show up at pages five and six of Claire's slide -- depending on what problem you're trying to solve or what base case you've got, you've got a different grid.

So even if somebody says there's this plan, well this plan is showing you two different grid buildouts, depending upon what happens. The single most important thing I think we learned was that so good, so far, but it's not enough. You're not done.

There were challenges to the plan, because it didn't consider offshore wind locations. Well, now we have NREL data on offshore wind capacity resources, so there will be a next step to expand the scenarios to include those matters.

We're going to expand our charter to more formally include regulators in the effort, and regardless of how fast or how slow the legislation goes here, we're going to proceed to the next step.

I'd be happy to take questions from you later.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Steven. Michael?

MR. KORMOS: Good morning, Mr. Chairman and Commissioners. Thank you for the opportunity to be here today. I did provide written comments, and I'll quickly summarize what was in those.

We appreciate the opportunity. We believe the Conference is both timely and appropriate.

We understand there is clearly an increased focus on the critical role that the transmission infrastructure will play in realizing certain public policy objectives, particularly energy independence, climate change, and integration of large-scale renewables.

PJM believes that if the goal is an aggressive expansion of the grid to integrate large renewables, the

quickest way to accomplish that, is to expand the current Commission-approved regional planning protocols and cost methodologies, to clearly recognize this new goal.

PJM believes that guidance from this Commission is essential in assessing whether the current planning protocols and cost allocations, should be reassessed, and whether we should now have a third set of transmission projects that we would look at, that would not be justified under traditional reliability and economic metrics, and, instead, would look at the public policy goals of integrating large-scale renewables.

We believe that up-front policy decisions will be much more constructive than trying to look at this on a case-by=case basis.

We agree that the current Commission-approved regional planning metrics are somewhat limited. I would offer that they are probably a little bit beyond paint-by-number.

We've definitely been told to stay within the lines and we are only to look at expected load growth, actual interconnection requests that have moved through the queue.

We use the NERC reliability criteria and economic metrics that revolve mainly around reducing congestion. This is very different than an approach where we look at

"build it and they would come," transmission planning.

I do, however, believe that our current Commission-approved planning process is a means to identify and analyze projects, and, ultimately, in fact, get generation built, which I would hope would ultimately be the goal.

The benefits of the regional planning process that, currently, the RTOs are doing, is that the assumptions, the criteria, the analysis, is agreed to up front and understood, and the analysis is done then in a transparent process, to identify which projects ultimately meet those reliability and economic benefits.

Just quickly, our current plan is over $13.2 billion of transmission upgrades and additions. The projects are -- there are over 1400 different projects. They range from 69 KV to 765 KV, and we have enabled the interconnection of over 45,000 megawatts of generation to our grid.

We are currently studying 43,000 megawatts of wind. We have already interconnected 2200 megawatts of wind, and currently have 1600 megawatts under construction.

We also recognize that planning shouldn't stop at our borders, and we have been working with our neighbors in many ways to look beyond our borders.

I would offer, though, that the most difficult

part in doing the cross-border work, is the fact that we start with different assumptions, different criteria, and different cost allocations.

The problems we have encountered at our borders, have not been technical in nature. We understand the analysis that needs to be completed.

But, instead, the policy-level decisions that have been made or need to be made, regarding what criteria should be used throughout one party-built transmission and another party pay for it.

We participated in the Joint Coordinated System Plan, the JCSP, and we believe it should be viewed as a first step, a very good first step, but a first step and more work should be done, and we are committed to doing it.

I would offer that the JCSP offers a good example of both our ability to do the analysis and to do the technical work, as well as a good example of the difficulties we have when the assumptions and the criteria are not agreed to up front, and, ultimately, the difficulty we will have in actually implementing the plan, should we be able to move forward.

I do believe the regional transmission organizations, in coordination with their neighbors, are the answers, as opposed to creation of a new interconnection-wide planing entity. A new entity would still face the same

question, same issues, same challenges that we are currently dealing with on developing what assumptions and what criteria should be used to select projects.

I also believe the RTOs have existing processes in place, and we have a prove track record regarding the independence and the technical expertise.

I would also offer that a new entity, using a whole new set of assumptions and cost allocations, would only further the difficulties we have at resolving what happens at our seams.

We believe that Commission-determined Order 890 planning principles and cost allocations, should be expanded in order to provide for projects that promote public benefit. A rulemaking best serve as a timely solution to meet this challenge.

Again, thank you for the opportunity, on behalf of PJM, to participate in your Technical Conference, and I look forward to your questions.

ACTING CHAIRMAN WELLINGHOFF: Thank you very much, Michael. Lisa, please?

MS. BARTON: Good morning, Chairman Wellinghoff and Commissioners. I would like to thank you for holding this Technical Conference today and allowing me the opportunity to share the views of American Electric Power.

We applaud the Commission and its staff for its

efforts to bring industry leaders together to discuss these critical issues.

Today there is a growing coalescence of support for electric transmission that provides for the integration of renewables, energy security, reliability, efficiency, environmental stewardship, and energy independence.

AEP believes that there are three key principles which should guide us in meeting these challenges: First, creating an EHV interstate system, which is adaptable to the nation's future needs, is critical to maximize our ability to achieve these policy goals over both the short- and long-term.

It is becoming abundantly clear that we need to break from the past. Quite simply, what got us here, will not get us there.

In 2008, the U.S. exceeded Germany in the amount of wind that was interconnected. While the U.S. surpassed Germany, the U.S. potential for development is six times as great and its land mass 23 times as great.

What this tells us, is that to tap these resources, we must be efficient in the development of transmission.

We need to maximize our opportunities to advance the development of an EHV overlay through policy decisions that govern the development of that overlay, and by

encouraging RTOs to approve EHV plans that are under consideration.

Planning processes or analyses that focus on delaying EHV projects, need to be avoided.

Secondly, uniform EHV transmission planning protocols and criteria are needed. Today, transmission is planned on a rigid and often narrow reliability and economic criteria that varies significantly by region.

The result is a line-by-line approach to transmission development, rather than a system-based approach.

To develop an interstate transmission system, we need to apply broad and strategic views to EHV planning.

At a high level, AEP believes the following changes need to be made: Adoption of a single interconnection-wide set of planning criteria and assumptions that can be used to develop interconnection-wide EHV plans.

For interconnection-wide planning, there needs to be an overarching objective. Connecting renewables and other resources, is one; grid reliability and long-term robustness, is another.

Our load centers are well defined, with predictable bandwidths for growth; we know where our load centers are. Connecting these resources to load centers,

not by long-distance trunk lines, but by a mesh, a robust network of EHV and complementary HDVC, will enable us to maximize these resources.

These interconnection-wide plans should recognize the long-term value of EHV transmission and ensure its development is executed in a manner that provides predictability to renewable developers.

Thirdly, the efficient production, transportation, and use of electric energy, will be fundamental to the economic prosperity of the United States.

We need to maximize the integration of renewable and ensure that they are deliverable to our load centers. We need to ensure that the EHV system is efficient and utilizes smart-grid technologies to optimize its operational performance.

Finally, we need to be mindful of the future. There will invariably be technologies and generation sources available to us, that are beyond those that we contemplate today. It is, therefore, imperative that the system we design today, be adaptive and efficient to meet our future needs.

In conclusion, on average, the U.S. has one of the lowest electricity cost in the world. At the same time, we have vast renewable resources currently beyond our reach.

Our fragmented approach to transmission planning,

can be remedied through the creation of an EHV transmission system that overlays and strengthens the grid.

The approach to transmission planning I have outlined, can provide a strong platform to further our nation's policy objectives and grow the country's infrastructure in a timely and prudent fashion.

Finally, broad-based cost support for an EHV system, while not a technical planning issue, is at the heart of what limits the scope of our technical solutions.

AEP commends the leadership role this Commission has taken with respect to transmission issues. We encourage your efforts to raise the bar in the expectations of the transmission system.

AEP believes strongly in the vision of a robust and versatile grid that will position the nation to take advantage of new generating resources, whatever they may be in the future, and we encourage legislators, the Commission, and other policymakers, to take the necessary steps to attain these goals.

Thank you for the opportunity to speak with you here today, and I look forward to answering your questions.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Lisa.

ACTING CHAIRMAN WELLINGHOFF: Before we start with Pedro from Southern California Edison, thank you for your making it. I know it's been difficult getting in. Some of you who have may have been more aware of the surroundings, may have noticed that we just got our Court Reporter.

Not only have I been taking a lot of notes, we've also been recording the earlier portion, so all of you who have testified before, the Court Reporter, I assure you, will have a full transcript of this proceeding.

With that, Pedro, if you could proceed, please?

MR. PIZARRO: Thank you, Mr. Chairman and Commissioners. I'm glad to be here. It was only slightly less challenging to get here, than to get a permanent transmission line.

(Laughter.)

MR. PIZARRO: I'm speaking this morning on behalf of ESE and the Edison Electric Institute, and we appreciate the opportunity to address this important topic.

In California, there are over 6,000 megawatts of wind, solar, thermal, energy biomass, and thousands of additional megawatts are planned in SCE's interconnection.

Alone, we have over 40,000 megawatts of active requests, 86 percent of which are from renewable resources, thanks, in part, to the decisions of this Commission.

We are currently constructing transmission facilities that will deliver these resources to load, however, as you all know, these resources are often located far from load, making the siting and permitting of these facilities difficult, which has presented unique operational challenges that some of these resources present.

Let me start by speaking on behalf of EEI and its member companies, to briefly highlight the utility investment already underway, which is already significant.

There should be a bar chart here on my right, which depicts what our member companies have built and are planning to build to meet various needs, including renewable resources.

Actual transmission investment from 2000 to 2007, totaled nearly $50 billion, and while the totals are not yet in, in 08, it was believed that $9.5 billion was invested last year, with another $21 billion coming this year.

In February EEI completed a new report, Transmission Projects Supporting Renewable Resources, which is right here. It provides information on EEI member projects and development that were recently completed, access to renewables across the country.

Many of these projects are projected to be in service by 2015, and we have copies and these are on the EEI website, also.

In short, shareholder utilities have the construction and financial capabilities to build interstate transmission facilities identified, through a Commission-approved planning process, as needed to support development of renewables and other resources.

Now, turning to speak on behalf of SCE, I'd like to share some thoughts on the transmission system planning issues that the Commission has raised in this conference. You asked whether current processes are enabling the development of transmission to interconnect renewables. We believe they are.

I will highlight four major efforts currently underway in the West: First, in California, we have the Renewable Energy Transmission Initiative, or RETI.

RETI is designed to create a 20-year outlook for transmission planning for renewables, through a statewide collaboration of all interested parties -- federal, state, and local agencies, environmental interest groups, generation developers, and transmission owners.

RETI has already identified potential transmission to serve generation currently operating or in development in California's competitive renewable energy zones, and it is now studying what it will take to serve renewables that are not yet in development and additional work is needed.

But the conceptual plans identified through RETI, will provide a strong foundation for both state and federal designations aS renewable resource transmission corridors.

Second, the Western Governors Association has a similar initiative for transmission throughout the West. The western renewable energy zone documents have just been posted for comment.

Third, WECC has a transmission expansion planning and policy committee that is evaluating a number of potential projects. This organization develops common economic and technical databases for monitoring economic benefit and potential investment in new transmission, and serves as a clearinghouse for interconnection expansion planning. Finally, we are evaluating projects which will be of value throughout the southwest United States.

All of these regional and subregional planning efforts ensure that potential new projects can be properly developed to maximize system benefits, economically.

Turning to the challenge that is the focus of today, the operational challenges, PG&E, SDG&E, and SCE, have recently funded an independent analysis to better evaluate the integration and operational issues.

The study considered the existing 20-percent renewable portfolio standard in California, along with the potential for 33 percent or even higher goals, and we

anticipate that the study will be released shortly, but I want to share some of the key findings today.

First, higher renewable levels can result in significant amounts of surplus energy that cannot be used on the grid or sold to others. Power must be offloaded when generation is greater than load, and an export capability in California, is likely to be happening in March through May, when hydro, wind, and solar production can all be high, while the system load is far from the summer peak.

Energy storage and off-peak electric vehicle charging, will mitigate the need to dump this energy in the future. We're excited about that. However, these energy stores are not yet mature enough to significant contribute to most resource plans today.

Additionally, the smart grid is still being developed, and it will be several years before it's capable of fully integrating such technology.

Second, to maintain grid reliability and higher renewable levels, will require higher planning reserve margins to back up the system when these resources are incapable of producing sufficient energy. We need higher ancillary service levels to require the proper type of generation and the storage technologies to meet system regulation load following and ramping requirements.

As we plan for larger amounts of renewables in

our portfolios, we need to complement those renewable resources with quick-start and passive technologies, to maintain generation variability and system reliability.

The California Independent System Operator has begun a stakeholder initiative to better understand the specific operations and performance implications of higher amounts of renewables within its control area.

Finally, they typical six- to 11-year lead time for transmission construction, is a barrier, and one of the most significant hurdles we're seeing, is obtaining right-of-way permits over federal lands.

In some cases, it takes many months and even years for necessary special use permits, even after a project's environmental recommendation has been approved and even on existing rights-of-way, since much of the western renewable resources require transmission to traverse federal lands.

FERC can play a major role in facilitating sister agencies' review of these projects, so that timely rights-of-way permits are issued.

Thank you again for the opportunity to be here today, and I look forward to any questions.

ACTING CHAIRMAN WELLINGHOFF: Thank you very much, Pedro. Joseph?

MR. WELCH: Good morning, everyone. I, too,

enjoyed the trip coming here this morning.

As we've talked in the past, what we need -- and I'll start off by saying, as we need a national energy policy to guide planning, we need a national policy to guide us, so we know where we want to go, renewable resources, energy efficiency, greenhouse gas emissions, et cetera, everything is in play to make the regional grid more efficient.

The regional planning process under Order 890, calls for nine principles that must be followed. ITC is a member of MISO and ITC strongly believes that MISO follows these principles, and, furthermore, has an excellent staff that does an excellent job within the confines that it's allowed to work in.

While it's important to get stakeholder input and stakeholder control, that's what's causing the problem. Long-term membership and pressure from state groups that leverage the voluntary membership, give the RTO a tough environment to operate in.

Another major governance issue, is the combination of running the market and having the responsibility for transmission planning. While many utilities will join the market, they oftentimes don't want their transmission assets involved in regional planning, and they also aren't interested in any kind of voluntary cost-

sharing.

Because of the market influence, the RTO too often relies on uneconomic redispatch to handle congestion. I've included a graph in my presentation, to show how the number of TLRs that are uneconomic redispatches, have continued to increase over time, since we began the RTO process.

Every year, in MISO, they have to deal with stakeholders who threaten to withdraw, if MISO doesn't meet their needs. They do this just to keep the pressure on load.

Stakeholder involvement is good, stakeholder control is not. When you look at the generator queue, you can see this is as it manifests itself. The RTO governance issue truly shows its ugly head, when you look at the queue to interconnect renewables.

According to some estimates, we have a 46-year queue. We can see the reaction that the cost causation approach dictated by the stakeholders, is not working.

We decided the green power express solution to solve this problem. To get the vast wind resources of the Dakotas and upper midwest to become integrated with even a much higher-voltage network that should be built in the future.

Green power express demonstrates that

independents can deliver the plan and get the job done and delivered. What we know today -- and these are the important things -- the current process is inadequate. We need a larger planing footprint.

The current coordination is inadequate, and the stakeholder input is good; control is not.

Lastly, I believe there's a short-term fix we can implement, that really should help get us started. ITC believes that many of the policy visions and goals held by FERC and other leaders, can be achieved by requiring the RTOs to generate a regional transmission plan under the instructions from FERC.

For example, FERC can instruct the RTO to develop a regional overlay plan for their respective regions, and then RTOs could be required to submit these plans to FERC under a docket that is open to intervention and comment by stakeholders that are not involved in the development of the plan.

This would set a finite time for comments, so that the regional transmission plans could be compelled and move forward, while fitting nicely into the FERC's nine planning principles.

Let me summarize again: The current process is inadequate. We need a larger planning footprint, and we need to give the RTOs direction and really unload them from

having to deal with the stakeholders. Thank you very much for your attention.

ACTING CHAIRMAN WELLINGHOFF: Thank you, I appreciate it. Gordon?

MR. van WELIE: Good morning. Thank you for the opportunity to participate in this very important discussion.

In my view there is an undeniable link between a comprehensive regional system planning and the development of transmission infrastructure. New England's unsuccess in building reliability transmission, bears this out.

As I explain in these comments, the regional planning project was initially used to identify transmission project needs to connect renewable resources, and to prioritize those projects that make the most sense from an economic standpoint and consumer standpoint.

After several decades without major transmission investment in the six-state region, transmission is actively being developed and approximately $4 billion of new transmission projects have been built and put in to service in Connecticut, Maine, Massachusetts, and Vermont, and we have approximately $2 to $3 billion of transmission underway through the siting process.

I firmly believe that it is New England's transparent and open planning process that has demonstrated

the need and created the support for these reliability transmission projects to move forward.

This process will enable us to conduct long-term economic analysis and can also work to help develop transmission infrastructure for the integration of renewable energy projects. The New England Governors recently asked ISO New England for assistance in performing this type of long-term operations planning to integrate renewables.

To the extent that integration of wind projects can be achieved more easily over a broader geographic area, existing regional processes also serve as the basis for broader planning, including on an interconnection-wide basis.

As an example, coordinated planning between ISO New England and the New York ISO, is currently underway and has identified an interconnection reinforcement project that has identified an additional outlet for the portion of the nearly 1500 megawatts, either in service or currently under development in the northeastern part of upstate New York.

Several of our states have significant resources and have established aggressive goals to develop on- and offshore winds. Numerous developers have made proposals for biomass, hydro, and wind facilities.

Given our geography, it seems logical that as the New England region takes steps to develop its own internal

and offshore resources, it would also consider options for accessing large renewable and non-carbon resource proposals north of our border in Quebec, New Brunswick, the Maritimes, and the Atlantic Provinces.

I think it's important for the Commission to understand New England's proximity to eastern Canada, as it compares to its proximity to the Midwest, as shown on the map provided.

In fact, the New England Governors and eastern Canadian Premiers, have recently established an inventory of clean energy proposals in their respective jurisdictions, and have reviewed conceptual comprehensive pathways to access these developments.

This effort has been designed to build on the transmission plans already underway in the respective regions. Regional planning also has a role to play in the development of broad interconnection-wide transmission plans.

As this is considered at the federal level, ISO New England -- and here I can speak for the New York ISO, as well -- urges that any effort for an eastern interconnection utilize a bottom-up approach to ensure that the benefits of existing regional planning efforts are preserved, and state energy goals, attributes and regulatory structures are incorporated.

Specifically, such a process should be based on regional plans that are integrated and harmonized by a federal entity. I think this will be an iterative process, but RTOs should remain as the primary planning authority for managing the integration of renewables in their footprint, for the reasons mentioned earlier by Rick Sergel.

New England's richest renewable resources are geographically remote from the consuming marketplace, and in certain cases far from the interconnection to the bulk transmission system.

While the region recognizes the need to build transmission to access these resources, it has been challenged to sort out how the needed transmission will be paid for, who will benefit from it, and, specifically, how so-called economic transmission should be defined.

I think this issue is the primary institutional barrier to the construction of transmission for renewables. I'm pleased to report that progress is being made.

Today, the region is gravitating towards a model that would overcome concerns about the allocation of benefits, by bundling energy and transmission costs into delivered energy price contracts.

This approach allows for the comparison amongst projects and the identification of projects that can increase renewable supply most economically. Clearly, there

are other solutions for planning and funding renewable transmission that should also be explored.

Determining whether a transmission line is economic is very difficult, requiring stakeholder agreement on the assumptions surrounding infrastructure costs, fuel costs, and delivered benefits over a 30- or 40- year period.

The only way to truly determine whether a project is economic, is for developers to bring forward, a bundled solution to their stakeholders, and, at that point, determining what is economic and what is not, or which projects are more economic, relative to others, will become known.

The benefit of this model, is, it gets the affected parties to the negotiating table, resolves the cost allocation issue, and ensures competition amongst projects. This is the point at which policymakers can intervene with additional incentives.

Federal and state policymakers have a number of tools at their disposal for affecting economic outcomes, and, if necessary, lowering the economic threshold for projects.

New England has proven that regional planning is essential for developing reliability-based transmission. It can also be an effective tool for the development and accession of transmission to integrate large-scale

renewables in a cost-effective manner, while contributing to national renewable energy goals.

Thank you very much for the opportunity.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Gordon. Nick?

MR. BROWN: Good morning. Thanks for the opportunity to be here. Being last on a long panel, to much of the discussion, I could say "ditto."

I will share a few facts about the Southwest Power Pool footprint. In 2005, SPP had 24 new wind interconnection requests in our queue. In 2006, that number jumped to 49 new requests; in 2007, 65; in 2008, 139.

Our queue now stands at over 50,000 megawatts, and let me remind you that our peak demand in the footprint, is 45,000 megawatts.

Let's compare that to what's actually in service. We only have 2900 megawatts of wind in service this year and only expect another 500 megawatts by the end of this year.

So, how is wind being added in our footprint? Some attempt to bring wind generation on service through the QF process, typically, there is no transmission available to make that happen.

Others have attempted to come online and provide the wind energy through our EIS market. However, the current capital structures are making that more difficult.

Eighty percent come online through purchase power agreements with load-serving entities -- 80 percent. Even that is challenged, based on the fact that in the SPP footprint, we have very few states with current renewable portfolio standards, and those that we do have, are a few years out in the development.So wind developers are typically not building transmission infrastructure, yet they are waiting on that infrastructure to be paid for through other processes, so the vast majority of the wind, either has already ended up on our suspension list, or soon will end up on our suspension list.

When I look at SPP's planning processes, aside from the generation interconnection queue, we have our aggregate transmission study process that aggregates requests for transmission service from any number of requestors.

What we also have is our annual transmission planning expansion process that looks at a two-year vision. That is primarily focused on reliability and some economic projects are taken into account.

Most recently, as you are well aware, we've added our balanced portfolio process of economic upgrades to capture what I call the low-hanging fruit of EHD expansion in the footprint, and, beginning in 2007, we begin a very visionary effort at looking at the 20- and 25-year needs for

both reliability and economics.

I'm happy to report that the plan that came out of even that initial effort, over the last 18 months, has taken very few changes. It looks at a figure-8 of extra high voltage within the SPP footprint, and is truly visionary in nature.

In addition to that, SPP has been a very proud participant in the JCSP project. As others commented, I think that is a very good first step.

I'm happy to report that we do have a coordinating teleconference call scheduled for tomorrow, to look at next steps, going forward. I could talk about any number of other efforts underway within our footprint.

SPP has a Wind Integration Task Force actively working, and, in addition, we are working with any number of projects with the Electric Power Research Institute, dealing with the challenges of planning and operating large degrees of variable resources.

So, let me share with you, my thoughts on the challenges that we're facing. Planning really isn't the issue. We've planned for a long time, and, as others have indicated, cost allocation is the challenge.

On top of cost allocation, the biggest issue is, well, what scenario are we going to plan for? What scenario is justified from our cost perspective, and what plan is

justified to meet the needs of all the individual entities?

From an operational perspective, SPP Is currently working on a consolidated balancing authority for our footprint, and also on implementing a regulation market for our footprint, both of which, I believe, are absolutely necessary to implement the large degree of variable renewable resources in the footprint.

We are working on cost/benefit analysis to justify the move down that road. My personal perspective is, depending on how we develop the economic models and looking at the cost justification of those, at the end of the day, if we're going to implement the magnitude of renewable resources in our footprint, we don't have a choice but to implement the consolidated balancing authority and the regulation market.

I've contended for any number of years now, that we have ten percent of our business constraining 90 percent of our business, the ten percent being our investment in transmission assets.

The reason for that is, that transmission has been reactive in nature. We build what is needed to reliably accommodate the requests for interconnection and transmission service.

We don't look at that on a proactive basis. We need to do that, and improve the efforts of our EHD overlay,

working in close coordination with our regional state committee, we are developing, in a very proactive way, the cost allocation within our own footprint for that, and look forward to dealing with cost allocation on an interregional basis.

Many years back, I was attending a NERC meeting that happened to be located outside central Florida, outside the Orlando area.

MR. PALMER: You have gone over time.

MR. BROWN: It's very short. I was fascinated to learn that I was actually on the right path, driving from the airport to the location, and despite the fact that I felt lost, I was out in an area where there was no development, but yet there were three lanes in both directions, streets.

I finally arrived at the hotel, pleased that I wasn't lost. Three short years later, attending the same meeting at the same hotel, I was fascinated by the development in that area, and thought, wouldn't it be great if transmission were developed in a proactive way, to enable that kind of economic development.

Some acted, a developer acted with the foresight to make all of that occur. We need to look at transmission in the same way.

Thank you, and I look forward to your questions.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Nick. I want to thank all the panelists. This has been very interesting and very useful.

We've left a good bit of time for questions this morning, as well, so we want to get to those questions from my fellow Commissioners. From Commissioner Azar. Phil?

COMMISSIONER MOELLER: Thank you, Mr. Chairman.

Today we're talking about integrating renewables into the grid. The premise of all of your comments is, how do we get more transmission built as soon as possible?

A general question for just about everybody, as you wish to comment, it strikes me, going back to Nick's last point, that we have kind of a dearth of information on good cost/benefit analysis on transmission investments.

I tend to think the investment kind of gets short shrift. To the extent there is cost/benefit analysis, because perhaps it's valued at a much shorter timeframe than its actual useful life, it's always hard to quantify reliability benefits versus economic benefits.

Then, of course, the nature of transmission, the amount of power flows, is difficult to completely track. Am I correct in that assumption, or am I wrong? If I am correct, how can we do a better job?

I think, ultimately, if we have a better sense of cost/benefit analysis, we will get more built, reflected in

a positive ratemaking process. Betsy, I'll start with you, since you were the first speaker.

MS. MOLER: Thank you, Commissioner. I think we have a great deal of information about cost/benefit analysis for smaller, incremental additions to the grid. I agree with you that we're not very good at doing the big picture on a cost/benefit basis.

That's why I think it's really so important that we do the big picture and apply economic planning criteria. I think the suggestion that Lisa made on behalf of AEP, that we develop interconnection-wide planning criteria, including the cost/benefit analysis, is absolutely critical here.

COMMISSIONER MOELLER: Steve?

MR. KOZEY: I think it should be best done on a large set of projects, some of our incrementalism -- that is this line, single lines, single project worth and who would it benefit when we know it's being attached to an AC interconnection that will have other changes to the interconnection over the same time that the initial project is there means if we chase individual projects too hard on their cost/benefit, we're likely to get it wrong twice, both about the individual project and for the whole grid.

MR. KORMOS: I agree. One of our other speakers said we needed a clear federal policy as really what you want to us to plan for. It would be really critical.

We're still struggling with what assumptions we should put in the model. I agree with some of the others, that we can do the cost/benefit analysis.

We know how to do it, but we argue a lot over what assumptions went into those models, also, what assumptions to decide who the beneficiary is, particularly in the longer term.

Short-term, it's usually more clear. We can clearly see reliability issues that are manifested as congestion issues, and resolve those, I think, in the longer term, and building it into a sort of longer-term approach is really where a clear federal policy would help us.

MS. BARTON: Commissioner, I think you bring up a very interesting point. This transmission system that we will be building, will carry us well into the next century, so it's very important that we look beyond the economic and reliability benefits and look to define the broader system benefits that can be achieved through an EHD overlay.

One of the ways we think this can happen, is really very similar to an approach AEP used in the '60s, when it planned the 765 system that it has for the seven states in the eastern part of the system.

You first start with a vision for the interconnection. What is the need, the need of load, and the scenario for generation development.

Secondly, you start with a conceptual analysis and you start to look to identify different scenarios, and you evaluate those scenarios, the benefits and the costs associated with each of those scenarios.

Then, finally, it's execution through stating, so it's really a three-step process, and it's actually a relatively simple process, if we unlock ourselves from our past and start looking forward and not trying to drive EHD development by looking through the rear-view mirror.

MR. PIZARRO: I think I would add one other component. We're all learning together, especially as we look at the role of transmission, not just for its traditional objectives of reliability and economics, but as a critical highway and access point to meet other social policy directives.

With the example of renewables at hand here, if you take a look at the example we had here in California, where this Commission is supporting innovative work, and how we looked at the Tehachapi Line and to advance the trunk line approach, that recognized that this is not just a generic interconnection.

There was a large trunk line to an area of location-constrained resources. That, I think, also captured the notion that this was a lower-cost way to helping California meet its state renewable mandate, and,

therefore, that other objective also had to kick in.

I think, as we look at and understand the renewable goal in California, but potentially having a federal-level renewable portfolio standard in the future, making sure we're laying in that notion of the benefit the transmission is bring to lowering the cost of access to renewables as one of the components under the traditional economic analysis, I don't think that's always captured today.

MR. WELCH: I think that, for once, I agree with just about everything that everyone said, which is a step out of the norm for me. I think you have to start from the top down.

The biggest frustration for me, being only in the transmission business, has been everything that I've gone through to try to get it built. When we started the business, I thought, after the blackouts, reliability would be a real driver, and people wouldn't care to have another 50 million customers go out of service again, but I found out about 60 days after the event, that we quickly lost sight of it, and had we not re-complexioned NERC and actually put hard core, enforceable reliability standards in place, we'd still be having that argument over what constitutes a reliability project.

We really got into the aspect of this

cost/benefit, not from the standpoint of trying to figure out, was it needed; not to try to figure out how we would do it, but, I actually believe, to keep it from being half-done.

We put on every horn, buzzer, and whistle that we could think of to impede the development of transmission in the guise of cost/benefit tests, and them make it jump over hurdles that no other project in the world could do.

If we'd applied the same cost/benefit tests to the interstate highway system, that we have put on the transmission grid, it would have never been built; we'd still be going from place to place in horse and buggy; it never would have happened.

Let's get a policy in place that we need. If it's an RPS, let's get the RPS done.

The nice part about this, is the layout of the high voltage grid. Once you get it just built, it does all the other things anyway.

It will improve reliability; it will improve efficiency of the operation of the grid, and it will make controlling the grid or integrating the all these intermittent resources, a lot easier. It will do all of those things, but we need to start with a policy, so we can at least design to some standard, and actually cut out the whole issue of the cost/benefit test.

MR. van WELIE: I think there's two stages to the discussion. We have gone through the State 1 and are in the middle of Stage 3 in New England.

Stage 1 is the sort of thing that you do the scenario that we did a couple of years ago, and some scenario analysis for the JSPS. We essentially get a feeling for what's possible.

What you're doing, is running very high-level production cost models, maintaining some broad-based assumptions about what transmission would cost, but you're not down in the details.

You get a sense of what's possible. That doesn't give you economic transmission projects. The problem then becomes who makes the decisions about those assumptions? Who decides that gas is going to be $5 per million BTUs, or $12 per million BTUs in your model?

Who decides what the transmission costs are going to be? Who makes the guarantees that the transmission won't become double or triple what they were when originally estimated?

That's the second part of the discussion that we've been struggling with in New England for the last couple of years. We put a lot of the scenario analysis work out on the table, and that took us to that next stage of discussion.

Quite frankly, we struggled to find an answer to this. The answer that seems to be emerging, that most people can buy into, is, put those two things together, put the energy and the transmission together, and allow a developer of transmission to get together with developers of renewable resources, and bring forth a project.

Ultimately, let the stakeholders who will be signing onto that project, be at the negotiating table to decide whether they can get the benefits or not. RTOs and federal planning authorities, are not well positioned to create certainty around these assumptions.

The only way you can create certainty around these assumptions, is through contract. The question really is, who's going to be the contracting authority?

Is it going to be some great federal contracting authority that signs all these energy contracts and all these transmission contracts? Is that going to be done at a state level, or is that ultimately going to be done by transmission owners negotiating with wind developers, bringing back their projects for approval by the state regulators and perhaps some federal authority.

I think that's the issue that we have to solve for.

MR. BROWN: In our cost/benefit analysis, the biggest challenge that we have faced in realizing the

economies that transmission affords, is that in many of the regulatory models, they are only limited on production cost savings.

Nowhere are we valuing the options for generation supplies that are opened up to hundreds of small municipals in our footprint, that each only needs five or ten megawatts, but yet when they issue RFPs, no one responds, because of the transmission constraints that are in place.

We don't value what this means to enable renewables, have them plugged into the cost/benefit equation. Again, my view is that it's going to take a visionary developer that can take a certain amount of risk, based on that view of the future, and make the transmission occur.

The long-term vision is challenged by two other regulatory terms that our members are faced with quite often -- least cost, not most value, but least cost, and "used and useful."

Used and useful by whom and during what period of time? That ends up being a challenge when you're performing cost/benefit analysis. So, I throw those out for your considerations.

COMMISSIONER MOELLER: Those answers are even better than I expected. Thank you.

A quick question to Betsy, since you you've worn

a hat that we wear. I want to put you just a little bit on the spot.

Where did we collectively go wrong, to where we have all of the different cost allocation methodologies and the sense, at least in my mind, that we're just not moving quickly enough in getting transmission done?

MS. MOLER: I don't think we've gone wrong, but I think our world is changing. Even two years ago, you didn't have a discussion on RPS and climate imperatives that we have today.

I would suggest that sort of planing, on a utility -by-utility and then a regional basis, has made sense over a period of time. But the world has changed, it really has.

We cannot meet an national renewable portfolio standard, unless we enhance the transmission system, and it has to be done in a way that takes into account, demand response and all the different resources.

I think that we need to look ahead. I would encourage you to be bold as you think about it, because I think you hear a collective request from this panel, and I expect the succeeding panels will have the same. And that is, we need leadership here and we need to have the big-picture criteria established by this Commission, because the world has changed.

COMMISSIONER MOELLER: Thank you. A couple quick points: Pedro, thank you for mentioning the federal siting corridor and the need for federal agencies to coordinate.

It's not as big a problem in the East, but it's huge in the West, and I hope that as Congress considers legislation, they recognize that if federal agencies aren't really given some accountability in terms of timelines, the best plans could be thwarted, so I appreciate that in your comments.

I feel like I've kind of been shouting from the mountain tops for the last ten years, about the need for more transmission, and it's nice to see more of a national consensus coming along on this, and, again, I appreciate the panel's comments, Mr. Chairman.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Commissioner Moeller. Chairman Schriber, come join us, Chairman Schriber. We have a place for you at the table, where you can ask questions and interact with the panelists, if you'd like.

We appreciate very much, your attending the meeting. Thank you.

Questions? Suedeen?

COMMISSIONER KELLY: I'd first like to give Joe an opportunity to respond to Gordon and Nick. I was looking at you, Joe, and you have some thoughts.

MR. WELCH: Well, I did.

(Laughter.)

MR. WELCH: I don't think I was responding too much to Nick, because, actually, what Nick had to say, was correct. I think that if you're going to try to go to a specific generation and specific line to support that generation, and do that on any kind of cost metric, you are setting yourself up for failure.

This is not going to support the broad-based grid; it's not going to support all of the other things that we need to get done to rebuild this transmission grid in the United States.

When you start to look at that, it's a really seductive thing, to do what they are doing, because it eliminates the toughest condition that you're going to have in front of you, which is the cost allocation issue.

If I can just get one generator and one line and pipe it into someplace over here and say, this is who's paying for it, I've got it licked.

I don't have to go through the rest of the stuff and I don't have to sight anything but that one line, but the fact is that we need a grid. The grid is what brings us the reliability; the grid is what gives us the optionality for the future.

The grid is what is going to allow us, when we do

develop a really strong, clean-coal technology, to use that technology. The grid is what's going to allow us to use the demand response that one single pipe for one dedicated piece of equipment, is not going to do those things. It just simply is not going to do it.

And when I'm back in the office, if I have our Executive Vice President in charge of planning issues, who's going to stand up and just support the grid? I'm tired of the grid getting the bad deal, so my job here today is to support the grid.

I am not a believer in these other patchwork projects, because this is exactly the process that we have. We look in MISO -- and I'm not condemning MISO, but this is the process they've been dealt by the stakeholders -- one generator, one interconnection, one generator, one interconnection.

We don't look at the broad plethora of where we're at, where we're going, and what we have to do. And if we don't do that, we're not going to it cost-effectively for the country.

I'm not talking about cost-effective for this customer or this region; I'm talking about for this country. This is where we have to come. That's why I had that look on my face.

COMMISSIONER KELLY: Thank you. I appreciate the

panel's comments. In particular, I think it helps focus us beyond the question of who's going to site these lines and who's going to plan them, although that's what we talked about initially, who's going to site these lines.

It seems that the debate has changed from what it is was just three years ago, when we were looking at federal siting as a means to overcome the NIMBY challenge that probably still exist, but it seems that it's a bigger issue now.

We are looking at the federal siting authority as a way to achieve goals, not just to overcome challenges to those goals.

For example, to achieve reliability and achieve optimality in the development of our renewable resources. Almost all of you have talked about the need to decide, first, what we're planning for, but I haven't heard anybody put out a proposal yet.

I'd like to ask you what you think we should be planning for. By way of background, I would note that Texas, the Western Governors Association, and California, the three entities that I know of that, to date, have tried to plan for something, have all seemed to approach it the same way.

So let me lay that out and ask you if you agree that what they have done, is the right way to approach it,

or do you think there's another way? Should there be other goals?

Those three governmental entities have first looked to determine where the renewable zones are, then, which ones should be prioritized for development, because we're probably not going to be able to develop them all.

California said Tehachapi; Texas has outlined zones and prioritized them for development, but, third, I guess you could say "third," they've coordinated with load, they've talked to the entities that are going to be buying the power to ensure that they want the power.

You aren't going to build a transmission line from Wyoming to San Francisco, to put the wind on it, if San Francisco doesn't want to buy it, it would seem to me.

I understand that's some of the concerns about the JCSP. It's a nice plan, but New England may not want to buy Midwest or all of the Midwest renewables. They might want to develop their own and buy their own.

Then you deal with cost allocation, at least that's how these governmental entities have gone about it. Is that what we should be doing?

Should we be focusing on the renewable energy zones first, prioritizing them? It seems to me, also, if we're talking about an extra high voltage system in the United States, it's almost like Metrorail system. Once you

lay it out, then it's laid out and communities might be clamoring to have the Metro station in their backyard, because if it's a long way away, they may not be able to develop their resources, if they are too far from the station or too far from the line.

Joe and Pedro?

MR. WELCH: Let me say that there are some things we should be planning for. I've tried to prioritize them repeatedly when I talk to my staff. I think that at the top of our list, is just purely energy independence, and if we think about this, we've been on this trek to try to find energy independence in this country, since the middle '70s.

COMMISSIONER KELLY: By that, you mean, more than renewables?

MR. WELCH: How do we sustain this country without having to export all of our money to sustain our industries in this country. If we take a look at that, we can start where we want to go, but, clearly, then, renewables and energy efficiency come right to the top of the table.

They absolutely come to the top, because they are the things that we can exploit for the least amount of resources, and get it done. When we look at the renewable resources, they were not all created equal.

That starts to give people like me in my

business, a lot of headache. The thing that I noted and watched take place repeatedly, was, as we give tax credits for renewable resources, and people quickly learned that the transmission interconnection became the impediment to getting it connected.

What we found then next, was people siting their renewable resources as near to a transmission line as they could get, to get over the interconnection queue.

But it was also -- I hate to say like this, but it wasn't the most optimal renewable resource. What we have blessed the renewable resources with the baggage of, is high costs and intermittency, something we've all heard about, and a whole bunch of operating parameters that we don't like to operate with.

Had we done this with a plan, to the point that you're making, had we established a renewable resource zone and actually evaluated it, when we got through with our studies for the Green Power Express and we just got through with another one, and haven't put it in the public domain.

Here's what we found in today's existing technology of coal -- not clean-coal technology, but just new coal plant. And the existing technology that we have for wind today, the high-energy zones coming out of the Dakotas, is lower cost by almost two cents a kilowatt hour than existing coal technology today, in a capacity factor that

approaches 50 percent.

Why did we start to think about developing something that's down in the 20-percent region, that's going to come in literally almost at a five times cost ratio to do that, when we can move that power and solve a lot of other problems? Our goal should be to try to get that done and get done most efficiently.

We have great wind resources, we have great geothermal resources, we have great solar resources. We need to find the best ones and get them in here first and build the network, then build it from the bottom up.

I truly believe that that's what we have to do,and if we go through all this other stuff, we'll just keep passing the issue.

COMMISSIONER KELLY: Pedro?

MR. PIZARRO: Let me go back to your question. I think it's a really good one. I think the answer is yes, a qualified yes. The goals we have right now, if you take a look at, for example, the California examples or the western examples, they are all right now leading to planning processes that have a focus on renewables.

So the import of your question is, should that be the objective function? I think it's one of the important objective functions.

If you had a real forethought here and infinite

resources, and infinite time, you'd combine planning that included balancing renewables, reliability, et cetera, reductionality, doing it all.

But the reality is, we're all humans and we have limited resources and we can't do it all. I think the approach we've seen, is to acknowledge that, given the concerns surrounding climate change, greenhouse gas reduction and the role of renewables in that, renewables will be one of the important arrows in the quiver here.

Let's focus on how do we get some good, optimal, low-cost, high-value solutions around the renewable question, not the one generation/one interconnection model, but, rather, where there are some resource-rich areas that we can get into.

So that planning process , you can fine-tune further. The steps are working fairly well in identifying not just the Tehachapi, but the next sets of Tehachapis, like solar in the Mojave, geothermal in some other areas.

The other part is, we can't make the perfect become the enemy of the good, and we want to get this right, and one of the concerns I see, is, driven sometimes by well-meaning parties to refine further, to ask the question, not just look at this area that has high potential for resources, but show me the contracts or show me the projects.

That doesn't work in the market context we have today. The realities of the transmission, drives the process, because it takes six or seven years, up to 11 years, and that's a lot longer than the generation timeline, so it is not easy for me to expect that if you're planning the next line, that we're going to be able to go out and get, say, wind or solar contractual commitments, because that wind project may be able to be developed in a three-year timeframe, and maybe, as Joe said, on the PGC, we did not have this ability, two years in advance, were there a PGC or an ITC there to use the overall bid package.

What that means, is that society has to take some great measured risks, that process of identifying through planning, what the likely areas are, going ahead, siting, permitting, making the investments and building the highway ahead, so that then the communities can follow the generation, the generation development can follow, is the right approach, but we need to start and work that vision.

If renewables are part of the answer, let's go and solve the problem for that piece of it.

One more thought on that: There is a FERC role here, not only in supporting that approach, but also recognizing that it's possible that mistakes will be made in this process.

We also need to back up the process with tools

like abandoned plant treatment, so that if we, after all the processes have gotten it wrong, for whatever reason and the resources aren't built, that we don't send the a disincentive message for the next transmission planning effort.

COMMISSIONER KELLY: Thank you. Gordon?

MR. van WELIE: My point is that I think one of the most useful things that could be done at a federal level, is to define what's optional and what's not.

Why is reliability-based transmission being built? Because Congress decided it wasn't optional to not have the grid be reliable.

That's part of the struggle here. If we don't have clarity, whether we're going to definitely have a renewable portfolio, standard, or a carbon imitation, because of emissions, it will, I think, forever create uncertainty around what we're designing for and what the objective function is.

When you say to somebody, it's optional, they will find a way of getting out of it, so the issue is, are we serious about making this mandatory or not? If we are, then I think you go down one path and just solve what the objective function is.

Once you've decided that, I think the industry will solve for it. But I think, at the moment, there is

great uncertainty in those two areas, and I suspect we're not going to solve this discussion around transmission, until we solve those other two issues.

COMMISSIONER KELLY: Lisa?

MS. BARTON: The renewable development is certainly critical. That's one of the key things that any new planning initiative needs to take into consideration.

Also, what we can't forget, is, if we need to design flexibility and efficiency into that process, one of the cautions that I would throw out, relates to the concept of looking at contracts.

The reason for that is really geography. That type of approach might work well in an integrated grid, a very strong integrated grid, which is what New England has. That may work, but when you're talking about where most of our wind potential is in this country, a part of the country where there is no transmission, let alone an integrated -- tightly integrated, I should say -- transmission system, that's where you have a lot of challenges.

And if we truly, really do want to get away from coal, get away from some of the CO2-emitting generation sources, we need to offer flexibility over the long term. Unless the wind and the solar, unless they're deliverables, then it won't be an option to move away from some of the more traditional fossil-fired resources.

I just use the analogy of the highway system and what it has done, when you go to the store, the grocery market, you can see that we buy our artichokes from California, our oranges from Florida, the heartland of the country has soybeans and corn, and essentially this interstate system allows us to maximize this potential.

We can find that equally to E-H our system. The wind will blow where it is most available, and the sun will shine on the solar generating facilities where it's sunny all the time.

I will tell you that in some part of the Midwest, Ohio, where I live, it's not particularly sunny. There aren't a lot of hydro resources in that area, so, really what's the key for these parts of the country, is access to these different markets.

COMMISSIONER KELLY: To the extent that a resource, let's say, Maine wind, is more expensive than, say, North Dakota wind, to get to Boston, should we be making a social decision that would allow Maine wind to be developed? Or should we say, no, it should be the cheapest? It should be the lowest cost?

Should we take those economic developments and those state politics into account or not?

MS. BARTON: I think the cost is critical, certainly. In order to be economically viable, in order to

make sure that we have development potential for our commercial and our industrial load, we need to make sure that the cost of energy is affordable.

I do think the cost of production is key. That being said, it could be very expensive to move the power from, say, the Dakotas, to Maine, but that's where an interconnection line planning process would really be able to take that into consideration.

I would expect that there may be some development of wind in Maine, but not, certainly, as much as we would see in the heartland of the U.S. So long as it's developed so there's sufficient high-voltages lines, we can minimize the footprints in those Midwestern states.

It's long distance it needs to travel, a very long distance. Luckily, we do have the technology available to us to move power very long distances.

And as was said earlier, having a broader balancing authority, that, again, is a function that EHD transmission allows. It allows you to capitalize on those savings.

You won't need as much generation; you don't have to plan it on a local basis; we can plan it on a larger basis.

COMMISSIONER KELLY: Betsy?

MS. MOLER: I think economic planning has to be a

part of the equation, building the system at the lowest reasonable cost, absolutely has to be a part of the equation.

We have a program called Exelon 2020, where we've done a gas dispatch curve. It's been very instructive to us as we look at the huge challenge that faces us from a greenhouse gas perspective. I would encourage you to think about including renewables and other lower- and non-emitting resources, not just renewables as your economic planning criteria.

I would really like to think some more about it, and submit, perhaps, hopefully a more refined answer for the record.

COMMISSIONER KELLY: Michael?

MR. KORMOS: Absolutely the most important thing, is understanding where the new large-scale renewables are going to be, what zones, how much do you plan for.

But the other side of the equation, I think Betsy is bringing up, as well. What's going to happen to the existing generation?

Are we going to lose any of the smaller grid that will create room on the transmission system? Will we have nuclear development? What's happening on the load side?

I think a lot of those are maybe secondary, but just as important -- and we'll get into the cost-allocation

issue and the beneficiaries' issues, particularly on the energy efficiency side, demand response, and who ultimately will need the power and where it will go.

I would suggest that there's another level, even beyond where would the renewables be.

MR. KOZEY: We're hand-in-hand with hoping our group can get five states to agree within six months, about where the best zones are for renewables in the Midwest ISO, which can then match up with things like Michael just talked about.

It is a grid for all uses, even though the expansion is directed at harvesting wind.

MR. van WELIE: The idea is an appealing one. It's, in fact, some ways -- New England Governors and the Canadian Premiers have been doing in the last couple of years, which is to identify where the potential is.

I think it's a necessary step to identify where the potential is. I don't think that, on its own, it's going to get the transmission built. You have to focus on the other things that have been talked about earlier on in the panel.

COMMISSIONER KELLY: Just one small followup question: Can we do coherent transmission buildout with cost allocation approaches that vary within the interconnection, or do we need the same cost allocation?

Do we need the same numbers? Steve?

MR. KOZEY: For sure, you can't do it, if it's voluntary, as to which regime you sign up to.

COMMISSIONER KELLY: People will game the system?

MR. KOZEY: They'll choose where to be.

(Laughter.)

COMMISSIONER KELLY: You are much more diplomatic.

MR. KOZEY: The voluntary cost-sharing part of this becomes an oxymoron.

MR. MOLER: If we are dealing with a national imperative, a national policy objective to limit greenhouse gases and enhance our use of renewables, I cede that and I tried to explain that in my written submission and the sine qua non for interconnection-wide cost allocation.

COMMISSIONER KELLY: Nobody would disagree?

(No response.)

COMMISSIONER KELLY: Thank you.

ACTING CHAIRMAN WELLINGHOFF: Marc.

COMMISSIONER SPITZER: Thank you, Mr. Chairman.

Following up on some of the prior comments we have, the people of this country through their elected officials are interested in reducing carbon emissions and presumably renewables, that's given rise to the consensus that we have on the panel.

First a concern. We are in tough economic times, and when states have high unemployment rates and horrendous budget deficits there is a tendency to look inward, which poses challenges.

We have had a discussion on cost allocation. In such times there is going to be greater reluctance to accept

increased costs, particularly in the circumstance where a state has already constructed its transmission and they are being billed twice. In good times it is easier to look at those cost allocation issues.

Then secondly, states are increasingly--if I look at the press clippings--interested in native requirements for generation, which tends to frustrate some of the planning that is already taking place and causing these issues to be revisited.

So I understand it is an uncomfortable size and it is an uncomfortable topic. You've got stakeholders, you've got customers, but in reality, not withstanding the federal impetus to change, aren't we going to have increased difficulty on the resource side and on the cost allocation side, given the circumstances in the states.

MR. WELCH: Let me take a stab at some of that. Obviously--let me address the first one. There has been a lot of money spent, at least by some of the charts presented, on transmission. But there has been virtually no money spent for any high-voltage system and high-voltage overlay system.

For that cost allocation, I don't see that as being a problem. In fact, I would actually tell the FERC, when we talk about the underlying transmission system, not the high-voltage overlay, try to leave that still with the

states, they can dictate what they want to do, what I am talking about is solely the high-voltage overlay, and that which we need to implement national policy with.

Some people cut it at voltage levels, some people don't.

To the second point, that we have high unemployment, I think that it is in the vision of a lot of political leaders to use this as the time frame by which we transform our energy consumption, and how we do it in this country actually tries to decrease unemployment by getting this work done. We have a lot of work to do, and I have heard these numbers said before, so I will just give you the numbers that I have heard.

We export about $500 billion a year on oil. We are spending almost that much again to defend our rights to buy the oil. Those numbers equal in one year what we are talking about, the whole build-down of this high-voltage grid.

So the fact of the matter is, the money is being spent. It's a matter of how we choose to spend it, and whether we want to use this as a timeframe to move forward and get it done.

I see--I understand the problem. I live in a state with high unemployment. I have a really easy commute to work now in the morning as a result of it, and I don't

like it.

COMMISSIONER SPITZER: Joe, I understand what you're saying, but you are the only one that doesn't have to answer to a state where cost means a lot.

MR. WELCH: If you don't think I'm answering to a state--

(Laughter.)

MR. WELCH: --you must have missed some of the things going on. There is nobody in this environment in this business that doesn't have to stand with their toe to the line on costs. It is whether we believe that we are taking this country in the right direction. That is going to take courage.

COMMISSIONER SPITZER: Nick?

MR. BROWN: Again, I think the real challenge for all of us is the arguments that this is an investment that is going to reduce overall costs. That was my concern earlier about a focus on least cost versus most value.

I will argue that if we can get better at our economic analysis and include all of the savings that a national EHD Grid can bring to bear in terms of access to lower-cost capacity in terms of our ability to reduce losses, we can go on and on and on.

There are any number of papers published about those, but we have got to do a better job at communicating

to the state regulators at the end of the day that their costs will go down.

COMMISSIONER SPITZER: They always agree on cost allocation.

(Laughter.)

MR. VAN WELIE: What we discovered, we started this discussion a couple of years ago on the assumption that we could come up with some method similar to the way we allocate reliability projects, we could come up with a similar measure for allocating the cost of economic projects.

The problem is--and I think it is a great question that you asked--the questions that came back to us were: So you're going to send me the costs, my fair share of the costs of the transmission line. What guarantee are you going to give me that I am actually going to see the benefits?

And it is not sufficient that you run a production cost model that looks out 20 years and makes a bunch of assumptions about gas prices; that is not a guarantee that I am going to see the benefits. And I think that is the issue.

So how do you solve that? Once you have solved that issue I think you get at your problem, which is: if it makes economic sense, people will get behind it and do it.

COMMISSIONER SPITZER: Pedro.

MR. PIZARRO: A little data I've experienced in California, we're going through a rate case at the California Public Utilities Commission. Of course there's a lot of concern in California about our high rates, as well as economic impacts, yet we have a state that continues to be committed to increasing renewables' penetration as well as looking at other measures to combat greenhouse gases.

Commissioner Spitzer you're asking a good question: what is the overall impact on ratepayers, voter support five, ten years out? I don't think we know the answer to that question, to be honest about that.

Also, we don't know fully the answer to the question of how much will it cost to not only build new transmission but more importantly access to renewables to get the integration that is needed to make this all work.

That said, we are moving I think as a country closer and closer to an environment where we will have a cost-assessed carbon emissions that will add transparency to the value that one is getting from an increase in the renewables' component to the portfolio. That is a long-term answer.

Second is a short-term answer, and I think Joe mentioned this already, but there are a number of fairly ready projects that can be taken on the transmission side,

and importantly for us also on the distribution side at the state level that will generate economic stimulus.

I think the federal bill recognizes that at the state level a rate case also recognizes that. And just two quick figures. When we took a look at our wires' investment, it is about 70 percent of our capital spending is capitalized labor. So that is jobs.

The second factor is that we commissioned Global Insights to do some economic analysis on the impact on the California economy on that capital spending. For every job at SC, one other job is created in the community around us. So that spending had a two-edged impact in terms of economic stimulus.

I think that is an important bridge towards explaining to the community: Yes, this is increasing rate pressure. Also it's helping the broader economy and the communities in which we live, and it is laying the building blocks toward a resource portfolio that had better be able to absorb and manage the costs. I think that ought to be recognized in the framework of the country.

COMMISSIONER SPITZER: That tension in California between north and south is playing a role in terms of wind? Is my perception accurate?

MR. PIZARRO: Support for these programs is probably pretty similar across north and south right now.

They are still stressing how concerned folks are about job creation within California.

And going back to a discussion we were having earlier, one offshoot of that is that there is a lot of focus on creating new jobs inside the bounds of the state. One of the things we like to point out is that there is an inherent tension in that because if there's a less expensive resources outside the borders of the state that will reduce greenhouse gases and increase renewables our customers should be able to access that to broader markets.

Yes, you may create an extra job if you keep that kilowatt hour in California, but that may not be the right answer for California or for society more broadly. You may be better off keeping costs a little bit lower across the board by accessing a lower-cost resource outside the state. Hence, the value of getting the transmission grid built to interconnect the resources where they are the strongest.

Then also beyond transmission, we would also advocate the use of renewable energy credits because there are going to be places where we can worry about transmission in getting the resource and getting it to the load center but not necessarily our load center.

Maybe we would be better off as a society trading the green attributes through a financial renewable energy credit market. That would help also to optimize the support

for transmission. But where you can't avoid a little bit of transmission investment and get the same benefit share to cost less through renewable energy credits, that might be an option for society.

MS. BARTON: Commissioner Spitzer, you are correct. We are in very difficult and turbulent economic times, but I would say that your challenge today can be turned into an opportunity. It is important to remember that transmission can reduce the cost of electricity. That's fundamental.

Also, EHE may not be expensive. There are a lot of synergies provided with an EHE overlay. Speaking form the AEP system, we have had this overlay in place for quite some time and we are the lowest cost transmission provider. It does not need to be expensive.

What you spend on the EHE system you're not needing to spend on the lower voltage system.

Secondly, we're talking about generation that will build U.S. jobs. That has to be done locally. The transmission has to be built by U.S. labor, and this is an ideal time really to start such a robust infrastructure development effort.

Also, with commodity prices at an all-time low we know what the future can have. And when you think of just, say, a year ago, and we were looking at the price of

gasoline at the pump going to $4, those times will come again. The economic good times will come again.

China, India, Russia, Brazil, all of those countries are developing at a very rapid growth rate and will come back. And as they do, commodity prices will be on the rise. The price of gasoline and other fossil fuels will be dramatically on the rise again.

So I think what we should do is take a look at this as an opportunity for growth, rather than a reason to put off growth.

MR. KORMOS: The only thing I can add at this point is the planning needs to be a process, and a very robust process. I don't think we are talking about just simply one plan.

We will get this done. We are going to need a very robust process that may have a long-term vision as to what ultimately the grid may look like, and there is an implementation plan as to how we go about bringing in the most valuable projects as they're needed.

That clearly shows the best cost benefit under the most scenarios, and I am not here to change that plan. If the assumptions we used to drive it start to change, then we in fact are willing to change with it and give them the confidence that we'll be asking for at least what we believed in initially in having a plan and having it move

forward.

MR. KOZEY: Something that is hard to communicate to stakeholders is that the do-nothing option is not a zero-cost option. Some people are going to look at this and say: You want me to spend X billions of dollars on transmission? Well, yes.

Well, I don't want to spend anything on transmission. Well, we have a job. The RTOs in particular, maybe with NERC's help, a job of convincing folks that even if we weren't embarked on an integrate-renewables mission, the grid is not going to be okay just as it is for the next 20 years anyway.

So if we have a chance to invest, if the people who put their money up have a chance to invest to create jobs in the short term and lead most likely to a lower delivered cost of energy in the future, that is a good story, once we can communicate that not making this effort is not against a backdrop of just zero costs.

MR. MOLER: Commissioner, certainly no one could dispute your observations about the challenging economic times we have. We all know that. But to me that is the reason we have to do a better job.

I don't think that you're going to be able to convince the public that we have done a good job if we just look at individual utility systems and don't take the

broader picture into account.

And as we look at our world of renewables and the need to have more low carbon resources, that really is why you have to do the kind of economic planning that takes into account efficiency, demand management, and other kinds of resource considerations. And you have to do it efficiently. And you don't get an efficient cost-effective plan if you just look at it as a single city, single county, single state; it's got to be regional.

COMMISSIONER SPITZER: One more question. You've got dealing maps. I assumed you want some response in dispatch? Who decides which map?

MR. MOLER: Ultimately I think it needs to be this Commission. FERC would be my one answer.

COMMISSIONER SPITZER: Do you know any state commissioners here?

(Laughter.)

MS. BARTON: I think we should actually start to think about an interconnection wide planning authority. I know there has been a lot of talk by folks concerned about the RTOs and so forth with respect to planning, but I think you will have an interconnection wide planning authority however that is formed, and there are certainly a number of different ways that could be formed to have this entity then post plans to the Commission for their approval. That is

certainly what we would advocate.

One of the challenges I think we would have with an approach that is looking at it from either the regional standpoint or the local standpoint when we got transmission owners that are not operating in RTOs, it's going to be very difficult for this Commission to choose between the plans.

There is going to be information overload. There will really be so much information. And one of the challenges is, when you look at it from a solution-standpoint, you really have to define the scope of the program and carve out the proper pieces.

If everyone is individually making their pieces for the puzzle, if everyone is making their own puzzle pieces nobody's is going to snap together at the end. I think that is unrealistic.

MR. PIZARRO: Again, in collaboration you ultimately have the responsibility when it comes to the siting and permitting process, you can play a role there in helping to streamline the process.

MR. WELCH: I would feel ultimately it has got to be at FERC. I would agree that we do need an interconnection wide planning authority. I do not think--this is not to say that the capability with the RTOs isn't there; I just don't think that the process lends itself to fragmentation of the RTOs and the lack of membership in the

RTOs to allow us to get to where we need to be.

I think we need a high voltage grid. I think the country needs it. We need to move forward with it. We need to get a planning authority in place, and it has to be someone who can do that.

Ultimately then you will get to make the decision.

MR. VAN WELIE: I think it is a two-step process. FERC or the DOE can require each region to bring forth their plan and then at a federal level we can implement these plans and optimize them from a national perspective and tell the regions to go forward.

I think the states should have the first shot at trying to site these lines. I think it makes sense for FERC to be a backstop.

MR. BROWN: I would say FERC. Also, as a person who tends to meet himself coming and going between different meetings of different organizational groups, the formation of yet another I have a problem with. And also within the joint coordinated system plan we have already shown an ability to work, and that was a first step.

But I think with FERC's guidance that we have shown our ability to work within the ISO/RTO community and others who participated in that process. Again, meetings are set up to continue that effort, but I think we do

ultimately need FERC oversight of that process.

ACTING CHAIRMAN WELLINGHOFF: Thank you. I want to give our states time for questions. Commissioner Azar?

COMMISSIONER AZAR: Thank you. This actually follows up on the last question on the Eastern Interconnection. I turned to the Chairman and said, I'm beginning to feel off the leash, after you series of last questions, but let's talk about what the state role should be.

You talked about the states having some sort of role in this. How do you fore see the states being involved with either FERC or the planning authority?

MS. MOLER: I would respectfully suggest that you have a vital role to play. You may not be the ultimate decisionmaker, but involvement in the planning process of the state commissions and their staffs, is very important.

It has to include other stakeholders, as well. I understand some of the frustration that has been evident on this panel about many of the stakeholder processes, but there's got to be a process.

I think it needs to be interconnection-wide. You have to have input. Then, ultimately, the entity that has the interstate authority, is this Commission.

That works, by the way, on the national gas pipeline model. There's a whole consultation model thing going on there.

It's also true for hydro facilities, so this has been road-tested.

MR. KOZEY: Commissioner, I think, especially with the participation of the assumptions, the vetting of the assumptions, that the planners, whoever they are, will use -- back to some of our other discussions -- load growth, either base assumption or scenarios.

What does it mean if State A says, oh, it's flat; State B says, it's 1.5 percent for their state, that they have a lot of focused information on it, because they are close to industry and government and job development in their states.

But to know that they are part of a region, that this plan is going to be for a whole region, how do you get enough participation to gain comfort that the end work and whatever sensitivity that's going to be done by the planner, is legitimate?

These assumptions were not arrived at to drive a conclusion that they were assumptions that a broad community had created, once they had been discussed. You picked a core set to produce the work.

MR. KORMOS: I would definitely agree with what Steve just said. In driving those initial assumptions, what's going to happen in those forecasts, and what are the energy efficiency goals, the main response goal of existing

generation and interchanges in that?

All that means, I think, state participation, and, to the extent it can be done regionally with the states, I think it would be truly helpful.

I also ultimately think, at least at this point, we are going through the state siting process, at least in our area and being able to determine need, particularly on a regional basis. This is something I think the state could really help us, to make sure we understand what your authority is in siting lines, based on the standards and making sure that our models line up with that.

MS. BARTON: Clearly, the states play a very important role. I would say it's an even more important role, if we start talking about an interconnection-wide model.

That is sort of to provide input with respect to the identification of resources that need to be preserved, assumptions used in the planning process, as well as the ultimate design.

I'll just throw out an example. There may be a couple on an interconnection-wide basis, a couple of different scenarios.

Betsy was saying earlier that you can have an HD DC line that's going across your state, or an AC line. It would be very important to hear from the states as to which

is the preferred outcome.

With the HD DC line, you get to have the line sited, but you're not necessarily getting the benefit, so what's where it would be even more important, going forward, to have state involvement in that interconnection-wide planning process.

MR. PIZARRO: The California example here is useful. The PUC and the Energy Commission are sponsoring the RETI process, to look for these. Ultimately, it leads to projects that are adopted by the California ISO.

They may relate to FERC in terms of final approval, but that's an important goal in making the determination.

As to licensing at the state level, our state commissions certainly control one important key. It may not be the ultimate part that Commissioner Spitzer asked about in the last question, but it's a critical one, without which we can't progress.

MR. WELCH: I think I want to echo what everyone has said. The state commission plays an important role, and it starts from the bottom up with load forecasts, agreement on energy efficiency, and, candidly, a solid look at what the expectations are that you're going to get from a high-voltage system, to the point of whether you want an AC or a DC line going through your state and whether you're going to

take some of the offtake off that.

In either event, you're going to get that decided. At that point, what I would also take back from that, because you are part of the process, we need to establish in your minds, state commissioners, why this process is needed. This gets real complicated.

MR. van WELIE: I think it will be extraordinarily difficult, if not impossible, to get this done without the support of the states.

Ultimately, I think the states have to have ownership of these plans, and, if they don't, I think the state regulators feel that they will become bound to act in the interests of their consumers, and I think you'll turn this into a litigation exercise, not a transmission-building exercise.

MR. BROWN: I certainly wouldn't feel obsolete. I think our state commissioners have been so heavily engaged in our regional planning processes over the last five years, it's almost as if each year, that engagement increases, through the efforts of our regional and state committees.

I would also argue that we're still only talking about ten percent of what's in the rate base, even going forward, even with the increases in cost for the EHD overlay.

There are also increased costs in generation and

on and on and on. It's ten percent of that rate.

ACTING CHAIRMAN WELLINGHOFF: Thank you. Chairman Schriber?

CHAIRMAN SCHRIBER: I notice we're pushing the time limit here, so I just may --

ACTING CHAIRMAN WELLINGHOFF: I don't think anybody's going out to lunch.

(Laughter.)

ACTING CHAIRMAN WELLINGHOFF: Given the weather outside.

CHAIRMAN SCHRIBER: Just a couple of statements: I think part of the issue and part of the challenge, is dealing with a lot of states, many, if not all of whom have different approaches to their power siting.

Some states have had no power siting board. As Chair of the Ohio Commission, I chair the Ohio Power Siting Board. We have a very, very good power siting authority. It has nothing to do with me. It's all legislative.

But I will say -- and I am quoting one of the provisions in the law that governs our power siting. It says the Board must find that the facility -- and we're talking about transmission -- the Board must find that the facility is consistent with regional plans for expansion of the electric power grid, of the electric system serving the state and the interconnected utility systems, and that that

facility will serve the interests of electric system economy and reliability.

I think I'm not proposing that each and every state adopt our authority, but I think what we have, is pretty good authority, and it does recognize the nature of the system and the critical nature of interaction with other states.

I guess maybe this is a sort of a rhetorical question, but there's been a lot of reference to the interstate highway system as an analogy. Remember that before the interstate highway system, there was a rail system that was designed, and that rail system was designed with avocados from California and oranges from Florida, but what happened?

Well, we had a technology evolution, and what happened? We had trucks, and what happened with the rails, once the trucks got rolling?

We all know, so I guess my question -- and, maybe probably, it's just a rhetorical question, is, once we get by the trucks and get into some new technology, what's going to be moving the avocados and the oranges?

That brings me again to the question of what's going to happen down the road. Betsy said it earlier; two years ago, this discussion didn't take place.

I never heard it three or four years ago, about

wind power. What's it going to be with technology evolving, and how can we build a system that accommodates whatever it might be down the road?

I'm convinced we're going to see a lot of stuff in the next few years.

ACTING CHAIRMAN WELLINGHOFF: Does anybody want to take that one on?

MS. MOLER: Let me just try one thing. Utilities are faced with it every day. The world changes, you just have to keep up.

And the planning mechanism has to be holistic and flexible enough to recognize the changes. The models have to be able to do it, too. That is not insoluble.

MR. KOZEY: To oversimplify it, if Roger Hart, our Vice President of Operations, were here, he would say, Mr. Chairman, a robust one, give me a grid that's strong for a lot of uses, whatever the planners plan, and, potentially, the builders build. The operators are going to use it for the most reliable dispatch, whether it turns out cities at night, you know, becomes forces of reactive power or whatever.

The plan will be created for a robust grid that can be used not just to maximize one particular role. We think that's the one we're working on.

MR. KORMOS: Robust planning ability to be

flexible. We have moved dates, we have cancelled projects, we've changed projects, as the assumptions have changed, as the technology changes.

I would just consider that robustness of whatever we put into play.

MS. BARTON: First, I wanted to comment briefly on the Ohio siting process. With AEP being in 11 states, the Ohio siting process is a very workable process, and we applaud the state's efforts in that regard.

They really are very much leaders across the country with respect to the siting process. We have in some of our areas, with some of the states -- it is still local, and that will probably be a challenge when we start talking about siting some of these EHD transmission lines.

To talk about briefly, your second point that technology may change and perhaps the engineering, it's important to look to the probability of the laws of averages.

When you look at the technology, what are the likely technologies that we're going to see? It's going to be, in Generation Five. If we just take a look into the future, we will probably get much more of a proliferation of electric vehicles.

The larger demand for electricity, going forward, on the generation side, as I mentioned earlier, there will

be so many different generation technologies available to us 50 years from now, beyond what we can contemplate today. What that means, as was indicated by Michael and others, a robust transmission infrastructure that will allow us flexibility for the future, is really key to our success.

MR. PIZARRO: Similarly, a lot of your question really goes to saying in different words, what's the possible effect of technological obsolescence and the stranding of this massive investment in the grid?

Anything can happen. There's exciting stuff going on in the labs right now. You look at a future where there's much more distributed generation and you really don't need the grid.

At least for the foreseeable future, the only thing that any of us can really work with, is the ten-year window. We tried to do 20; we have the models to do it, but, realistically, the knowledge evolves so quickly that I call it a ten-year window.

We have significant need for major-scale bulk power in this country. We have across the country, a fuel mix that is, on average, about 50 percent coal.

We will have greater and greater pressure to make it more and more greenhouse gas-compliant. We can't do that overnight, because we have investments that have been made, that need to go beyond that, and we have the potential for

actual increases in electricity use, offsetting some other things that we hoped to see gains in efficiency for. Plug-in hybrid electric vehicles, one study from an internal study that we've been doing, looking at the Southern California Edison grid, if you assume that by 2020, they have something on the order of the penetration of new plug-in electrics, similar to the penetration for standard hybrids today, that could drive our load up by about 11 percent or so.

That's a pretty conservative set of assumptions. Assuming we have a penetration of plug-in hybrids and other electrics similar to the current hybrid penetration, that would be a significant way of achieving the greenhouse gas reductions.

Even for the near term, bulk power, with more of it coming from renewable resources.

MR. WELCH: I would echo what everyone has said, and add to that point. If you take a look at where we're spending money today on the technologies that we're trying to drive, we'll get some answers with the probability of stranding this grid in the near-term future.

Of course, we're striving for more renewables. That's one of the reasons we're here discussing it today, and we need a robust grid for that. But we're also now taking a look at putting a lot of money into technology and

trying to figure out how we're going to use this natural resource called coal in a carbon-free society.

We're spending a lot of money on that. I have always had confidence in our scientists, that they will crack that for us.

Here's what we know today: We know where those coal deposits are at; we don't have to guess at that. We also know where we have strata formed in this country to sequester coal.

If we, in fact, are going to keep it in the ground, we know where that's at today. We know where the wind profiles are at; we know where the geothermal is at; we know where the load's at, and we know we're going to spend a lot of money on transforming the automobile fleet in this country, and we have to.

With those things in mind, I don't see us in any jeopardy of stranding this transmission grid throughout all of our collective lifetimes. I don't know about you, but I want to live a long time, so I just really believe that we are seeing a lot of effort being put into that, and we are going to see different forms of generation, but they're going to be always fueled with one of those resources.

MR. van WELIE: I agree with the previous comments, that there is very little risk of the transmission assets and the transmission investments, being stranded, and

that the greatest cry for innovation, is going to come on the supply and demand side.

I think we're facing a future where the grid is going to be operating very differently, with a high degree of intermittent resources and distributed resources on the system, and we're going to need a robust grid in order to make that work.

I think the challenge, quite frankly, is what we're talking about here, which is an economic development goal and an environmental goal, and, ultimately, we're going to try and find a win/win here.

That's why I think it's so important for us to be able to build this, bottom-up, so we have ownership of this.

MR. BROWN: We need to view transmission as the enabler for all of these new technologies. Lisa and others hit the nail on the head, because the technology developing on the generation and the load side, and, today, transmission is the lagging impediment for those technologies.

ACTING CHAIRMAN WELLINGHOFF: I'm only going to ask one question. I know we're all hungry and want to go to lunch, but I've got one question for you, Betsy, and that is your recommendations, the second and the fourth recommendations, the second one being, the Commission should immediately require an interconnection-wide transmission

planning, using economic planning criteria, and the fourth one, that we should require competitive process to build the most cost-effective transmission system.

Do you believe we have, currently, the authority to do both of those things?

MS. MOLER: I'm not -- it would be good, if your authority were enhanced. We would hope to have both of these addressed in the new federal legislation, but I think you hear a hunger here for leadership in this area, and I would reach for what you can do to make that happen now.

I understand that you don't have authority over the munis and coops, in particular, but I would reach to do what you can at the present time.

ACTING CHAIRMAN WELLINGHOFF: With that, I think we can all go to lunch. We will start back here at 1:15, and the panelists will have lunch upstairs on the 11th floor in the Commission Library.

(Whereupon, at 12:15 p.m., the technical conference was recessed for luncheon, to be reconvened this same day at 1:15 p.m.)

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

(1:15 p.m.)

ACTING CHAIRMAN WELLINGHOFF: Why don't we get started with this afternoon's panel? This panel will be on the operational challenges and innovative solutions to integrating the new resources into wholesale electric markets, while maintaining bulk power system reliability.

The challenge is a mouthful. We certainly are glad to have this panel, and we have a lot of very distinguished individuals who have a lot of technical information.

They can help us to look for solutions to these challenges. We first have Bradley Nickell, Renewable Integration Director for the Western Electricity Coordinating Council; Clark Gellings, Vice President of Technology with EPRI; Hamid Elahi, General Manager of GE Energy; Rick Gonzales, Vice President of Operations, New York ISO; Rob Gramlich, Policy Director, American Wind Energy Association; Brian Parsons, Project Leader, Grid Integration, National Wind Technology Center of the National Renewable Energy Laboratory; Russ Guttromson, Manager, Renewables Integration, Pacific Northwest National Laboratory; Robert Kahn, Executive Director, Northwest and Intermountain Power Producers Coalition; and Brian Silverstein, Senior Vice President of Transmission Services,

Bonneville Power Administration.

If we could start with you, Bradley, please?

MR. NICKELL: Good afternoon. Thank you for the opportunity to address the Commission on this important issue.

The Western Electricity Coordinating Council is one of eight regional entities in North America, responsible for assuring the current and future reliability of the Western Interconnection.

WEC's role is one of coordination and not advocacy. In this capacity, WEC, through its member committees, provides impartial reliability information on aspects of planning and operations, to decisionmakers in the Western Interconnection.

My remarks today center on the operational challenges of maintaining reliability with increasing levels of variable generation, as well as examples of some of the innovative solutions considered or applied by WEC members.

We know that to retain system frequency, generation must be balanced over load in real time. Variable generation sources, such as wind and solar, make this task more difficult for the electric power system operator.

The challenge, as levels of variable generation increase, is to assure that appropriate levels of system

flexibility are available to maintain frequency.

I guess I'll tee this up. So what is system flexibility? Flexibility, in this context, is the ability to change the output of another resource, in response to the variability.

Flexibility can be acquired through any combination of an entity's own generation, market products, variable generator management, energy storage, such as plug-in hybrid electric vehicles, or demand response.

We also use terms such as regulation, ramping, ancillary services, or operating reserves, to describe flexibility. Increasing the level of variable generation, increases the flexibility required of the rest of the generating fleet.

Thus, reliably integrating variable generation, is a matter of determining how much flexibility is needed, where it is needed, how much it will cost, and who should pay for it.

There is flexibility in the existing system, that could be used to balance variable generation. Much of the challenge is making it available to those who need it.

In addition, base on studies performed by WEC and our members, significant addition to the variable generation, will require that additional transmission and flexible generation be constructed.

Included in the available generation flexibility, is the variable generation itself. As an example, wind generation has limited dispatchability. Current control technology allows for the limiting of ramp rates, as well as generation levels.

As the penetration of wind increases, the ability to participate as a source of flexibility, will be vital.

However, under the current production tax credit structure, there is a substantial penalty for wind generators to participate as a source of flexibility.

Concerns have been expressed by some WEC members, that the PTC, in its current form, can lead to inefficient operation.

An assessment for the potential of this problem and identification of a means of resolution, are needed.

Entities in the Western Interconnection, have spent considerable effort over the past few years, to identify common challenges and work collaboratively on regional energy issues.

Mr. Pizarro earlier highlighted a few of these, many of which WEC facilitates. I would like to bring a couple other examples of these activities, to the attention of the Commissioners.

First, the Joint Initiative, as a voluntary project sponsored by Columbia Grid, Northern Tier

Transmission Group, and West-Connect, collectively, these three subregional planning groups cover most of the non-ISO areas of the Western Interconnection.

In addition, the project has many participants among WEC member utilities, merchants, and other stakeholders.

The goal of the Joint Initiative, is to tap into the existing flexibility that exists within the Western Interconnection. To that end, the Joint Initiative is recommending changes to transmission service provider business practices, to allow for, within our transmission and energy purchases and scheduling, as well as developing a dynamic scheduling system.

Another example is the Joint Guidance Committee of WEC members, which created a Variable Generation Subcommittee, VGS, back in October. The purpose of this is to holistically address the challenges of variable generation.

The Subcommittee is made up of a broad coalition of stakeholders in the West and includes the involvement of FERC Staff from the Office of Electric Reliability.

The VGS serves to facilitate the development and implementation of solutions that both add value to WEC members and assure the future reliability of the Western Interconnection.

In conclusion, variable generation poses a unique set of challenges. The full range of flexibility from existing and new generation, transmission, technology innovations, and market initiatives, will need to be employed to optimize and share the breadth and diversity of the Western Interconnection.

This, in turn, will support the reliable integration of substantial levels of variable generation in an efficient manner.

WEC, through its role as the regional planning and policy facilitator and provider of credible and partial interconnection-wide information and analysis, is well placed to support those entities that ultimately have to make decisions and ensure the reliability of the Western Interconnection. Thank you.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Brad. Clark?

MR. GELLINGS: Thank you, Commissioners, thank you for the invitation.

The need for additional transmission capacity, in order to facilitate renewable generation adoption, as been pretty well discussed and documented.

Less obvious, are four areas of technology development, where I believe we need to go, if we are to achieve any of the ambitious goals that have been suggested

by states and the Federal Government.

My written comments detail all of these, and I will only briefly mention them: The first is the enhancement of transmission technologies themselves, things like advanced conductors, the evolution of high-voltage DC, power electronic devices, and so forth, which will enhance both our ability to use existing rights of way, as well as provide for optimal use of new rights of way, as we begin to plan them.

The second, Nick Brown, my colleague has already mentioned, and has to do with an area of working grid operations and planning. Nick helped us launch a new collaborative initiative this year, which we've gotten very good response to, to provide a series of tools for system operators in digitalization, monitoring, forecasting, various probabalistic approaches, new probabalistic approaches.

The third is energy storage. As we march across the chart in terms of implementing renewables, somebody already mentioned the use of the words, "dance partner," and we need to think about how best we can manage the variability of the resource, wind, in particular, but central station solar would be just the same -- different, but just the same in terms of degree of difficulty.

Compressed air energy storage, high-temperature

materials, advanced batteries, nano-based structures, we need to move forward and evolve those in order to make the best use of storage.

Then, finally, the renewable generation technologies themselves, I think it's wrong to assume that it has moved as far as it possibly can.

There's a number of areas where we think we can continue to see a reduction in costs and improvement in performance of the renewable technology itself, including the operation and maintenance of those technologies. Thank you.

MR. ELAHI: I'm glad to be with you here this afternoon.

Over the past six years, we've been involved in a number of large-scale renewable implementation studies. We've listed those in the second slide in my handout. These studies were aimed at quantitatively examining planning and operation of North American power grids with high levels of wind and other variable, renewable generation.

These studies were commissioned by ISOs, state agencies and more recently by DOE. They have looked at the time frames, ranging from microseconds to minutes to hours, up to weeks and years, to assess power system stability, regulation, ramping, unit commitment, emissions, operating costs, transmission constraints, and the impact of load in wind forecasting.

Each study successfully pushed harder at wind operation. The first study, back in 2004, was driven by New York State examining the feasibility of dispatching 500 megawatts of wind generation in their system. The western wind and solar integration study sponsored by DOE and under expert guidance by the National Renewable Energy Lab is boldly asking, what do we need to do to put 50,000 megawatts of wind generation -- or even up to 72,000 megawatts of wind -- in the western grid?

What has been learned so far is that low levels

of wind and solar generation can be accommodated without much impact on the system. Penetration levels exceeding 25 percent of the peak load, and the total renewables -- wind, solar, geothermal and bio -- exceeding 30 percent of total energy, but not without impact and not without change.

To reach this higher level of renewables, we need implementation of new market rules and the incentives for owners and operators to utilize technology and assets. There has been a fundamental shift in the debate over renewable generation. No longer is the question, is it possible, but rather, how do we get there?

Finally, there are many key lessons that have been learned in order to implement high levels of wind generation. As others have said this morning, significant transmission reinforcement will be required to bring in the energy from what are generally remote locations.

Improved forecasting is also required. Today's power systems can handle a significant amount of variation in net load demands if they are prepared for it. Better forecasting will insure that the area's resources are available when you need it without overburdening the system for all the remaining hours.

In addition, the remaining generation of the system will have to start faster, ramp up and down quicker, back down to lower output levels, and be more responsive to

load following than in the past. The markets' needs should be modified to considerably reward the increased responsiveness in regions with multiple, smaller balancing areas. It may be necessary to increase the coordination between the areas, relax some of their rules, or merge some of the areas together.

It is also very important that wind and solar plants be added to the system as penetration levels increase. It will be critical that these resources provide more than just energy to the system. They can also participate in ramping regulation as required.

Thank you again.

ACTING CHAIRMAN WELLINGHOFF: Thank you. Rick?

MR. GONZALEZ: Thank you. Good afternoon.

First of all, I'd like to thank the Commission for the opportunity to speak on behalf of the New York ISO on some of the initiatives it's undertaken and is seeking to undertake in these matters.

The New York ISO is nowhere near being the largest ISO or RTO in the country, either in terms of loads served or wind penetration levels at this time. However, one of the important benefits of the ISO/RTO organized market models is that we can at all, in this electric industry, learn and perhaps benefit from the ideas and market rules in each of these markets that are developing

from stakeholder input. This is the nature of the discussion that I want to share with you all today, more aligned with the presentation I've included in the written materials.

Within New York State, the geography of where the renewable resources, more specifically wind, are located is in the western and northern parts of the state, and the load centers are in the New York City/Long Island area. We currently have 1275 megawatts of nameplate wind capability connected, and we recently put out a press release stating that over a thousand megawatts of wind energy is being produced on February 19. So it was a pretty high capacity factor for that hour and time. We have another thousand megawatts in the queue for 2009, and another 6500 in the interconnection queue for future years.

The next slide shows some of the geographical diversity, and where the wind resources are located. Commissioner Kelly asked, is it technically feasible to move forward with a wind forecasting effort. I'm pleased to say that New York has implemented a centralized wind forecasting capability and integrated it into its market system, both its real time and day-ahead market systems, in June 2008.

Currently, we are forecasting the wind plant output of 13 plants, and we solicited and are using a third-party wind forecasting company for this. As Rick Sergel

said, this is an area that the industry has to learn about. Certainly no one at the New York ISO is an expert on wind forecasting, so we solicited this expert service.

The next slide in my presentation is a diagram of the data flow, of how data is communicated to that third-party service, and to the ISO. And it's one model that works. I've provided some stats in my next slide: an average error of less than 5 percent for the hour-ahead forecast is what we're currently observing. Another way to say that -- that's about four or five times the forecasting error that we have for our load forecasting process.

Another way to say that is: for the same level of forecast error, that would be the same as a 20 percent wind penetration in our markets, so it will be four to five times higher.

In our day-ahead market process, we don't require that wind resource owners take a financial position. But we do account for their output in our reliability commitment process. So it's well-integrated into our market processes.

The next slide speaks to the cost of the wind forecasting service is being recovered by the wind plant operators, and they must supply site-specific meteorological data. That's the current requirement. I'm going to talk about some of the future requirements we're looking at.

In 2009, this May, we are seeking a market rule

change, tariff changes, to allow -- to improve the integration of wind resources in our security-constrained dispatch systems. If these changes are accepted by the Commission, it will require that wind plants receive and follow dispatch-down instructions to manage reliability issues on a five-minute basis.

This enhanced wind management capability will allow the New York ISO to use the most economic resources for New York energy while meeting all reliability requirements.

The next slide talks about some of the benefits of including wind on dispatch, and essentially will allow wind resources to indicate their economic willingness to generate or back down through an economic offer. Doing this on a five-minute basis is part of security-constrained dispatch, where it will allow for the optimal use and minimize any necessary curtailments, and minimize the need for out-of-market actions which could take more time and be in place for more time.

This is study work that's also being conducted. But I wanted to jump to the future enhancements.

Two of the reliability issues that we think will become more of a concern at higher levels of wind penetration are to accommodate some very unique operating characteristics of wind, namely high-speed cutout events.

In order to better predict those, we're looking at enhanced forecasting capability, and we also think that security-constrained dispatch can be used to address some of these very unusual operating characteristics.

For example, if it can be predicted that a large amount of wind generation is expected to be lost as the result of a high wind event, SCD could be used to limit the effect of wind plants to a level that would be within established reliability standards -- for example, first contingency operating reserves. So the operation of wind into security-constrained dispatch opens up a very efficient means to address reliability.

Lastly -- I know I'm running over time, and I apologize for that -- NYISO is also seeking tariff changes to incorporate limited energy storage resources into its regulation market. This includes flywheel and battery storage technologies, and adding these limited energy storage resources to our regulation market will increase the competitive nature of that market and will assist the NYISO in meeting its potential to increase regulation requirements.

Again, I apologize for running over.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Rick. Rob?

MR. GRAMLICH: Thank you, Mr. Chairman,

Commissioners, and staff, for the opportunity for the American Wind Energy Association to be here, and for hosting this conference. I'm filling in for Don Furman, who regrets he was not able to make it. I know staff was interested in part for his company's involvement in solar. I guess you'll just have to check with him separately. I can speak for wind.

AWEA has over 1900 members involved in all aspects of wind energy. Non-dispatchable resources such as wind and solar are going to help the U.S. achieve its renewable energy and greenhouse gas targets. That's why it's essential for this Commission to implement policies that will modernize the electricity grid to insure that variable resources are more easily and more cost-effectively integrated into the grid.

Last year, the Department of Energy estimated that wind power could supply 20 percent of the nation's electricity by 2030. That would amount to an increase from roughly 25 gigawatts of wind to over 300 gigawatts of wind power capacity. However, this feasibility study shows that there would be a need for an extra-high-voltage grid overlay and coordinated regional grid operations. It didn't take a position on policies to implement those, or get into the RTO/non-RTO debate, but just operating on a coordinated regional grid basis was found to be an important means of

achieving that, or critical to achieve that level of integration.

Just recently, AWEA and the Solar Energy Industry Association issued this report, that's on our web site. I can hand it out here in the room. It's a white paper outlining a federal legislative approach to advance transmission infrastructure through what we call the three Ts: planning, permitting and paying. These would be done on an interconnection-wide basis.

Many of the panelists on the morning panel discussed the area of grid operations, which is the subject of this panel. The white paper encourages this Commission to take a leadership role in implementing significant changes to the way the grid is structured and the way it operates.

We also support what NERC is doing, and the comments from Rick Sergel this morning on NERC's efforts, and the variable generation report that is coming out, we think, is a very important effort. We support the current draft of that report, and the basic message that we've got work to do we agree with, and we look forward to being part of that process as well.

In terms of what FERC can do in the grid operations area, I'll highlight a few areas. Number one: continue to support regional transmission organizations by

providing a broader geographic scope and essential market services. It is much easier to integrate variable resources located in RTO regions. It is vital that the Commission maintains existing RTOs, prevents utilities from leaving RTOs, and encourages other utilities to either join existing RTOs or forming new ones.

Number two: consolidation of balancing areas. Anywhere RTOs are not currently operating, finding ways to consolidate control areas is critical, as dozens of utility studies in the U.S. and Europe have already demonstrated. As you've heard from many panelists today, high wind penetration can be reliably accommodated at relatively modest integration costs, in the $3 to $5 a megawatt hour range.

The key operational change that is necessary is the consolidation of the current balkanized system of around 125 separate balancing areas into a more rational regional system. These studies consistently find that more wind can be accommodated at low integration costs when there are larger balancing areas, rapid scheduling and dispatch, robust transmission grid, greater use and integration of wind forecasting, and the availability of flexible or dispatchable generation and load.

A larger balancing area provides more access to generation over a broad regional area to better accommodate

the variations in electric supply and demand, reducing aggregate variability. Larger balancing areas are also needed for diversity in the geographic location of wind facilities. Both of these outcomes -- access to generation and wind diversity -- will help in significantly lowering integration costs.

Number three: market mechanisms. There are market mechanisms that the RTOs have that could be replicated in somewhat different forms outside of the RTOs, that could lead to the faster scheduling and dispatch that is needed to integrate wind at low cost.

And with my time running out, let me just mention wind forecasting. Other panelists have mentioned it's critical, not just advancement of that technology but the integration of it into power system operators' hands, as Rick described in the New York ISO case. And then finally, outside of transmission infrastructure, there are transmission services like conditional service, of which I know the Commissioners are well aware, that can be further pursued.

So when you get into the specifics, it is clear that the specific tasks vary quite a bit by region. We would encourage that the Commission work in partnership with states and reliability authorities and utilities in each region to figure out a plan for each region to implement

some of these changes.

Thank you again for the opportunity to speak here today.

ACTING CHAIRMAN WELLINGHOFF: Thank you, Rob. Brian?

MR. PARSONS: Thanks for the invitation to be here today.

My group at NREL is primarily funded by the US DOE Wind and Hydropower Technology program to examine grid interconnection operations and planning impacts to different areas given the variable and uncertain nature of scaling wind power. Integration in our mind is about the whole system and the most economic means of balancing load and generation due to the increased variability and uncertainty.

Hamid mentioned a bunch of studies that GE has been involved with. I wanted to bring up a couple of points from a study that was done statewide in Minnesota that we were involved in the technical review of. That study examined up to 25 percent penetration of wind by energy, and it found that there was definitely a need for some additional reserves, but that the total increase in all reserve types needed due to that additional wind was not much. It was about 430 megawatts of additional reserves on top of the base reserve of a little over a thousand megawatts. That's in a 16 1/2 gigawatt peak load system.

The annual average integration cost was found to be $3 to $4.50 per megawatt hour when produced. That cost is in line with many of the studies that have been done that examined large balancing areas with developed competitive market structures.

Grid operators have a large variety of means to do system balance. A bunch of them have already been mentioned. Obviously, fast response, flexible generators, coordinated regional grid operations, balancing area cooperation, through things like the diversity interchange and the joint initiative as mentioned by Brad already.

Another one is market scheduling closer to the operating hour, rapid update of sub-hourly schedules, and ancillary service markets. That could be very helpful for wind, because as was mentioned already, the forecast error goes down dramatically as you get close to the operating hour.

Certainly, strong transmission interconnections take advantage of wind plant geographic diversity. Operational forecasting integrated into the control room -- you've got to integrate in there, and New York's done a great job recently about showing us some of those advances.

Demand response has been mentioned, selective wind curtailment procedures have been mentioned other than deployment of advanced storage projects, including the

storage associated with concentrating solar and thermal power. We can get there fairly cheap.

Let me talk a little bit more about forecasting. It's becoming really critical as a day-ahead time frame that can really assist the operators in making economic selection of units reliable to meet the load and reserve obligations. In real time, the forecaster used to assist control operators in anticipating significant events. Some grid operators -- I'm sure we'll hear from Bonneville later -- have seen the need to forecast unusual external wind ramping events that could impact reliability. If these ramps are adequately forecast, they can provide a challenge to scheduled reserve capacity, particularly in more isolated grids, with geographically-concentrated high penetrations of their renewables.

Wind measurements and other detail can result in a significant improvement of forecast accuracy, in something as simple as knowing how many wind turbines are undergoing maintenance, which is currently problematic in many locations. That would seem to be a no-brainer.

Private industry operators are providing operational wind forecasts and are working to continually improve accuracy. National weather agencies are gearing up at this point for improvements in atmospheric modeling, targeting wind power forecasting instead of just telling us

when it's going to rain.

Grid operator and user interfaces, and situational awareness tools are rapidly advancing aspects of wind power forecasting. You've already heard a little bit about the big grid footprint studies that NREL was involved with developing and GE has committed funding for. The western wind and solar integration study is examining the West Connect footprint in detail, but is modeling the broader WECC footprint.

We've got the eastern wind integration and transmission study in conjunction with the JCSP that's already been mentioned. Both of those studies are looking at up to 30 percent wind penetration of energy, in the western study up to 5 percent by solar.

These large footprint studies are expected to be completed and publicly available. The western study is to be done by the end of 2009, and the eastern study should be available in September 2009.

Both operational and transmission analyses rely on a good understanding of renewable resource variability characteristics, and the laboratory maintains a data base of temporal profiles of historic measures of wind and solar power flow. We also have model backcasts that restore weather years. These are the kinds of things we're using in these broad group studies to capture geographic variability.

The grid entities and power professionals have varying levels of experience with these emerging issues. The NREL program works closely with the utility grid integration group to understand and disseminate information on wind integration issues. It has over 150 members including system operators, investor-owned utilities and public power entities. It provides a forum for critical analysis of wind power and grid applications.

The IEEE Power and Energy Society has put out a couple of special issues looking at the integration of wind, and they've got a planned one coming up on the integration of solar. Those kind of technical resources, I think, can help inform the engineering base on the decisions the Commission might be considering.

Thank you very much.

ACTING CHAIRMAN WELLINGHOFF: Thank you very much, Brian.

Ross?

MR. GUTTROMSON: Thank you, Mr. Chairman, Commissioners.

Today I'd like to talk about balancing generation and demand with a high penetration of renewables. As we've heard, today's grid has very little flexibility, certainly not enough for tomorrow's renewables, essentially no capacity to store energy, and we have very little ability to

control demand. In today's power system, operators control very few loads. They must control generation to balance.

As the variable renewable penetration increases, there'll be less ability to control generation, yet more variability that must be managed. That is, the problem is getting worse, not considering transmission issues. If 25 percent of load were served by variable renewables tomorrow, the variability of the grid would result in unacceptable reliability.

So how can the issue of balance be addressed in the emerging grid? Well, there is a solution, but there is no silver bullet. The solution is a combination of technologies, not a single technology. Primarily, they come under two different categories: operational solutions and grid technology solutions.

Operationally, we can share resources across balancing authorities. We can manage variability through geographic diversity, and we can implement wide area advanced controls. From the technology point of view, advanced forecasting is critical. There are different types of energy storage that will be needed, and there are many different types of storage for many different purposes.

Of course, very important is the issue of demand, or the technology of demand response. So how can demand response aid in renewable integration?

Demand-side resources can be used for many different ancillary objectives, multiple objectives, some simultaneously. It can be used for load-following reserves, some forms of regulation contingency reserves, peak demand reduction, congestion management, more throughput -- they will provide more throughput with existing assets, providing enhanced reliability for the entire grid.

At PNNL, we conducted a smart grid demonstration at distribution level. It was called the Olympic Peninsula Gridwise Demonstration. It explored how consumers' response to real-time pricing, tested smarter appliances in 112 homes for a year, and provided real-time two-way markets with real cash incentives.

This same demonstration also included grid-friendly appliances. These appliances tested device response to stress. It was a device used to respond to stress on a grid, and consumer acceptance of the device in the appliance. This device was unnoticed by homeowners, and was installed in 150 dryers for one year.

A few of the steps that PNNL continues to take are projects around the challenges of projecting wind ramps, meeting regulation and load-following needs, managing over-generation conditions, the impact of regulation conditions on hydro events, and better prediction of things like the sudden wind down-ramps in Texas in the spring of 2008.

Thank you.

ACTING CHAIRMAN WELLINGHOFF: Thank you very much, Ross. Robert?

MR. KAHN: Mr. Chairman, members of the Commission, thank you for the opportunity to address you today.

My name is Robert Kahn. I'm speaking today on behalf of the Northwest and Intermountain Power Producers Coalition, NIPPC, whose members operate approximately 4300 megawatts of capacity in the states of Oregon, Washington, Idaho and Utah.

We believe that it is fortuitous that the federal government itself has a high-profile opportunity to demonstrate how to meet the challenges posed by wind power integration. That opportunity resides with the Bonneville Power Administration.

BPA faces a genuine challenge integrating wind power. The influx of new projects coming onto its system is truly an embarrassment of riches. Regrettably, Bonneville's response so far has fallen short of modeling creative problem-solving. Here, briefly, are solutions that Bonneville could deploy swiftly, in most instances.

The agency could engage non-federal generators, both outside and inside its balancing authority, who are willing right now to offer regulation. Instead, Bonneville

has insisted that it and it alone will provide regulation of reserves. This isolationist response only serves to stress BPA's generation while imposing onerous costs on wind power generators.

Another solution would be for Bonneville to transition from hourly block scheduling to within-hour service, a long-overdue conversion many of Bonneville's transmission customers now urge it to make. The provision of dynamic scheduling for wind generators seeking access to serve load, or to contract with non-federal sources of regulation, is another missed opportunity.

In response, the BPA has protested that it cannot promptly offer dynamic scheduling. Several large wind power generators are now planning to organize their own wind-based balancing authority within Bonneville's BA, and in the wake of bypassing genuine problem solving, BPA has taken a most egregious action by forcing the renegotiation of both new and existing LGIAs in the name of preserving what we believe is an overly broad definition of reliability.

BPA has exacerbated a challenging engineering situation by locking itself and the wind generator operating in its balancing authority into an untenable position. There is, fortunately, a readily-available overarching policy that could guide BPA to get to where it needs to be. That, members of the Commission, is your policy.

I am referring here to the generation balance provisions embedded in the Commission's pro forma OATT. Implementing these provisions would meaningfully help Bonneville to integrate wind power, and integrate these resources to be delivered throughout the western interconnection.

A second solution, which could provide a model for the nation -- frankly, I'm surprised that no one has said this yet -- would be to treat wind as a must-run resource. Bonneville has deep experience with must-run resources, must-run generation, in managing the federal Columbia River hydro system for salmon, flood control and other non-power constraints. The difference here of course is that the federal government does not own the intermittent resources that are now seeking to integrate with Bonneville's transmission system.

Non-federal resources need equal access to BPA's transmission. This could be facilitated by implementation of the Commission's Order 890 OATT.

Third, the Commission should encourage Bonneville to promptly adopt new tools that can help it to respond to the variability of intermittent resources. Among these new tools are dispatchable thermal generation and non-federal hydro capacity that can, through transparent markets, cost-effectively reduce exclusive reliance on the federal

hydroelectric system.

Next, in the intermediate and longer term, BPA needs to build new transmission capacity that links its other markets, so that abundant Pacific Northwest wind can be delivered to loads looking for these resources. The construction of new transmission facilities will go a long way to addressing the challenges that Bonneville genuinely faces.

NIPPC believes that BPA, as a federal agency hosting an abundance of wind resources, is uniquely positioned to demonstrate how to successfully and reliably integrate intermittent resources. It is our hope that this Commission, in its search for ways to implement intermittent resources, will prod its sister agency to fully implement Order 890 so that Bonneville can fulfill its mission to expand the development of new and renewable generation, even as those resources are, like the hydro system itself, effectively intermittent.

Thank you. I'd be pleased to answer questions.

ACTING CHAIRMAN WELLINGHOFF: Thank you. Brian?

MR. SILVERSTEIN: Thank you, Mr. Chairman and Commissioners, for the opportunity to let you know that all is not doom and gloom in the Pacific Northwest, and we I believe are justifiably proud of our accomplishments with wind. Make no mistake, the challenges are real, and I

believe that in the region we're up to the task.

At this point, if you look at the map on slide 3, we have 19 operating wind projects, dozens more under construction or under development, and we are up to the task of integrating them reliably and cost-effectively. Also, as a side note on this chart, you will see 250 miles of 500 kV transmission projects that we're now launching as a result of our innovative Open Season project, supported by the Commission. The first project will start construction this summer.

If you look at the chart on slide 4, we reached the magic threshold on the Bonneville system this past year. In 2008, we now have wind as 15 percent of the load in our balancing authority. We're in effect doubling that. I'd say we're approaching proportions that you only see in Europe in the amount of wind integrated into our system.

As Bob said, we have a wealth of riches on the system. Slide number six is a chart of data from the end of December this year, showing that the challenges are real. They're really twofold, as described by some folks. One is the nature of the speed and quantity of the ramps that you see. The second is the forecast error. If you take a look under Sunday, you see a precipitous drop in the wind generation. Basically, the whole fleet disappeared from our system in a relatively short period of time.

The following day, on Monday, we had both a ramp-up and a ramp-down. Those are both challenges. Of course, when the wind disappears, we have to fill in the gap to be sure the lights stay on when people turn on the switches. But the movement in the other direction is also a challenge, especially when you're at times at the minimum generation level, and the limitations on the federal hydro system, where we have to avoid spill for dissolved gas reasons to restore the salmon runs.

The other challenge, as you can see from this graph -- the red lines are the forecasts, the blue is the actual generation, and you can see it's a significant gap. If there's a significant gap between the two, our calculations done with the region indicate that more than half of the balancing requirements that we are forecasting are associated with a forecast error.

So as we're preparing for this growth in wind that you saw in the preceding charts, we've worked with the region to try to find ways to do this reliably and cost-effectively. The region asks us, can you find a way to manage the amount of reserve that you need to be holding in order to enable wind integration?

We came up with a couple of approaches. One has to do with an approach for a forecasting accuracy certainly at least equivalent to the persistence: that is, predicting

that the wind, in the next ten minutes, will look something like it did in the previous ten minutes. But as a last resort, a way to control the wind, whether its movements are up or down.

This is very similar to the limitations on reserves in security-constrained economic dispatch that Rick just described a few moments ago. This is something we don't expect to use often. We believe that it's a way that we can manage. Customers have asked us to prospectively limit the amount of reserves that are needed to deal with the variability that we see here.

We are moving to the mid-term and longer-term solutions I've described. We reached agreement with our customers in a prior rate case that Bonneville would run a pilot with a non-federal generator inside our control area, our balancing authority area. That will be on line by the end of this fiscal year. We will actually have, for the first time, a non-federal generator under the control of the federal automatic generation control system to contribute to meeting the balancing requirements. And within the next two years, it's our intention to further increase that for other generators, both inside our BA and adjacent to our balancing authority.

We are working with utilities, with organizations such as Columbia Grid and TPG and others in the Western

Interconnection, to understand the grid impact of increased dynamic scheduling. This is not just a Bonneville issue. This is an issue for the reliability of the whole Western Interconnection. A system as twitchy as the Western Interconnection is, particularly at times of summer peak, we have to remember the Hippocratic oath: first, do no harm. We don't want to be putting dynamic schedules on that would put the system as a whole at risk.

We are working on other initiatives, including within-hour schedule changes. This will give us a tremendous opportunity to draw on resources as the winds change within the hour. But again, this is something that Bonneville cannot accomplish alone. There is a joint initiative in the Western Interconnection to develop scheduling protocols, to assess scheduling changes within the hour, and to add on top of that the opportunities for bilateral markets or other mechanisms for people to sell incs and decs so that we can make changes in the operation of the system within the hour.

There are clearly longer-term solutions, including build-out of the grid to introduce further diversity. We're working with our partners into Montana, Wyoming, Idaho to develop transmission plans to allow us to integrate wind projects, and in fact provide some diversity. And we've actually reduced the burden on the system for

dealing with variability.

And some of the technological challenges and technological opportunities that were described by a couple of members of this panel -- Bonneville has been a very strong supporter of the R&D initiatives on smart grid, distributed resources on a longer-term basis to spur opportunity. We are working closely with wind power operators, the owners of utilities in the west, and other independent developers and generation operators, to develop solutions that allow us to reliably and cost-effectively manage the wind fleet for our regional consumers.

Thank you.

ACTING CHAIRMAN WELLINGHOFF: Thank you very much, Brian.

Questions from my fellow Commissioners? Phil.

COMMISSIONER MOELLER: Thank you, Mr. Chairman. If we'd had Don Furman here, we'd have had a really Northwest seminar. But what I think is so interesting about the subject matter -- and I guess it was pointed out by the pilot project that PNNL did -- is that we get there. There are market signals that people respond to, and if they don't get the signals they're probably not going to respond.

Similarly, as Rob said many times in the past, the wind industry or the renewables industry favors organized market structures because of ease of entry. In

the Pacific Northwest, we are slow to embrace that for a various number of reasons. Yet what I think, Brian, you laid out is that regardless of whether you're going to do some of these things because Bob wants you to or not, you have no choice. You're going to have to go down that road, given the amount of integration that you have to plan for, and the reliability of the system.

For those people who don't hail from the Northwest, we have a judge regulating the river system flat out. So we are constrained, so to speak, on that subject matter.

So I guess for our last two panelists, I'd just like you to expound on this kind of concept, where we're moving in a way because we don't really have any choice, yet it conflicts with, frankly, maybe some of the attitudes about a more competitive wholesale power market.

MR. KAHN: I'll go first, if I can.

We have an aversion to markets in the Northwest, and I agree maybe it's time to get over that. In part because, if you have transparent markets and have robust participation in the kind of ancillary services I'm describing, you're going to get lower prices.

You also have a greater willingness of the independent generators that I represent to participate. We're just not going to be comfortable having Bonneville

promote AGC -- advanced generation control -- on our units, because they insist that they do so. We can participate in and through markets with a lot of participation that doesn't necessarily have to be limited to the IPPs. There are other generators who would come in and help.

I guess fundamentally, your point, Commissioner, is correct. We are at the point where we have no choice. We have a very robust, dynamic wind development happening in the Northwest, and it needs to happen. It also needs to be expanded. I think that's where we would certainly be in agreement -- into Montana, into Wyoming in due course, and perhaps, I would argue, into Alberta as well.

When that happens, we'll have even more challenges. But the broader the balancing authority, the broader the responsibility for integration, the more likely it's going to happen, and I would argue the more likely it will happen through markets at competitive prices.

MR. SILVERSTEIN: I think your observation is that it was a marriage made in heaven. It turned out to be in the other location.

(Laughter.)

MR. SILVERSTEIN: As you noted, we operate under tremendous challenges with the Judge operating the river. But even more than that, we've come to the conclusion that invaluable, incredibly flexible resources such as hydro are probably not the best use for dealing with these block changes.

Thermal plants are far more cost-effective to do that. The hydro system is great for dealing with moment to moment variability, which turns out to be not a great problem with wind.

That's not a big challenge. It's these ramps over 10 to 20 minute periods, and I believe there are other resources that are more effective in securing that response.

So while the Northwest clearly has an aversion to centrally managed, more organized markets, I don't think there's any objection to voluntary participation in bilateral markets. I believe people see it as an opportunity.

Some of the utilities in the Northwest have resources that are good candidates, and other utilities, the ones purchasing the winds, 75 percent of the wind in

Bonneville's balancing authority is actually going outside through other investor-owned, consumer-owned utilities. They'd all like the opportunity to acquire that.

I think it's a matter of putting the mechanisms in place, including working within the West so we have common protocols to making schedule changes within the hour, and then I think the markets will follow to allow us to tap into the tremendous resources available from other generation besides the federal hydro system.

COMMISSIONER MOELLER: In addition to mildly embracing Bob's suggestion, because I think Bonneville does need to go down that route for reliability purposes at a minimum, I still want to commend you for what you've done, the cluster queuing idea that one of your colleagues brought to us, that's been embraced by other areas, and as you said, ensuring progress towards --

The first ones actually coming forward this summer, where basically a lot of people put skin in the game. But you put it in yourself. That's a pretty good combination of getting things done.

MR. SILVERSTEIN: Thank you.

COMMISSIONER MOELLER: A broader question, and this will be my last one. That hadn't really struck me until I heard mention about the production tax credit. But the extent to which the tax will be relevant, I'm relying on

Commissioner Spitzer's expertise, and the extent to which the tax code should be thwarting some of what we're trying to do here.

Does anybody have, whether it's depreciation schedules or the fact that PTC only rewards you when you're actually producing, to possibly others, are there any other observations from the panel, to the extent that that's a problem? Rick?

MR. GONZALEZ: We think that the PTC can be reflected in economic offers for security constraint dispatch purposes.

We had some concerns regarding penalties for deviations during reliability periods, when we dispatched down generation, potentially wind generation values because we set our current penalties on the regulation current price, which is nominally around $50 a megawatt in New York.

So we had some concerns that, you know, whether wind resources would follow dispatch instructions, or rather the time. That was one of the issues, Commissioner, that we concerned ourselves with.

We wanted renewables to follow the need for reliability-based dispatch down instructions, and we wanted to make sure that those penalties would be sufficient to offset any production tax credits.

COMMISSIONER MOELLER: Any other thoughts?

MR. GRAMLICH: I was just going to say that wind is not the only resource to gets tax support from the federal government. It is useful to think about the optimal dispatch if you took into account greenhouse gases or renewable energy credits, for a more stable optimal system.

Some of what may look bizarre today may not be all that different from what you would find.

COMMISSIONER MOELLER: I guess one of the larger points is you have to be careful when the rules are put in place, so their scheme doesn't discourage perhaps a storage component to its own facility.

MR. KAHN: Just very quickly, I think wind should be first-run, must run. If you look at it that way, you'll organize your system accordingly. I think that's how the Spanish look at it.

In any case, the way we would look at it from the standpoint of thermal generation, were they unavailable to take curtailment that wind might not be prepared to take, if it can be executed instantaneously, which I believe it can, is that their PTC allows elasticity for them to pay us to fulfill their schedule.

So there is more, I think, flexibility than might otherwise meet the eye. Plus there's a factor on the table. Notwithstanding the comments from WECC, Congress just

extended that three years. This is a fact of life, so let's carry on.

MR. SILVERSTEIN: Let me just observe that there is a challenge at times, particularly during light load, heavy generation on the federal hydro system, that pushes the system to its limits. At this point, the gas plants are pretty much economically constrained off. So they're generally not available today.

We've seen periods this summer where the market price was minus 20 to minus 40 dollars. So you have the compounding pressure of the PTC during those time periods, plus a market price of negative 20 to 40 dollars.

MR. KAHN: We're going to have that situation regardless. That's the nature of the hydro system. But we also have very large coal assets that can be put to sleep at night, with huge benefits from a CO2 standpoint, with some integrated planning, yes.

COMMISSIONER WELLINGHOFF: Thank you. Just to note on that, we're currently looking at an environmental dispatch procedure. So if you had an environmental dispatch, green systems would be must-run ultimately. They'd be dispatched first. Suedeen?

COMMISSIONER KELLY: Thank you, John. Rob, I had a question about your testimony. The consolidation of balancing areas, as described and as the market mechanisms

are described, can you accomplish one without the other?

Can you have a consolidation of balancing areas without market mechanisms that gives you a better ability to integrate wind? If so, what is it about the consolidation in itself that does that?

MR. GRAMLICH: Yes, you could. The physical phenomenon is there are two things. You want large geographic areas that get diversity of wind output, and also access a large fleet of flexible resources, including Bob's gas-fired generation or whatever is the least cost flexible resource.

That's a balancing area issue, and you want them as large as possible, either physically or virtually. An RTO does it, but there are other ways to do it.

COMMISSIONER KELLY: You could do that without having a market mechanism?

MR. GRAMLICH: Without having a market mechanism, the other thing you'd want is fast scheduling and dispatch, i.e., something like ten minutes as opposed to hourly scheduling. That allows the system operator to quickly adjust for any imbalances.

You can do that also without a market. But a market allows you, in our view, the least cost means of getting supply and demand into imbalance, and provides open access, whether it's through Bob's gas-fired generators

today, offering that flexibility, or the storage resources that Clark is going to develop or demand-side resources or whatever it is.

So the markets in both cases, I think, are the most efficient way to go. But however you do it and recognizing that this region has different structures in place, what we need to get to is some form of coordinated regional grid operations with that fast scheduling dispatch.

COMMISSIONER KELLY: Given the penetration of wind in various parts of the United States today, in the absence of RTOs what regions are the best candidates for that?

MR. GRAMLICH: The interior West and the Northwest. Southwest, I guess you include. There are areas that have a lot of wind resources. They don't currently have an RTO. They're in much better shape than the Northeast.

The Midwest, now that MISO is there, SPP ERCOT in California are there other areas where we have significant challenges. Have the interior West and the Northwest ever heard a discussion about the issues in the Northwest?

I think the Southwest-West connect has also a list of a number of items that have general support and consensus from a number of parties, that would improve coordinated regional grid operations. Our concern is just

how many years those items have been on that list, and have not been implemented.

COMMISSIONER KELLY: Do you detect a broader interest in forming larger balancing areas in those areas, particularly the Northwest than there used to be?

MR. GRAMLICH: Yes. As I guess Betsy said this morning, the world has changed in two years. It's taken some time for people to embrace what the new challenges are from the electric industry.

There isn't any one institutional structure that is the answer. There are, I think, a lot of good efforts that are underway. This joint initiative across the West that Brad described and others, is very helpful.

I don't know exactly which way it's going to go, but I do think there has been a lot of change in the views of a lot of utilities and governors and others in terms of the way the power system needs to operate.

COMMISSIONER KELLY: How about the public utility commissions? Having been on FERC in 2003, and seeing the tail end of the opposition to RTOs, the PUCs in the Northwest were exceedingly opposed to markets, as I understand.

But do you see the PUCs more interested in larger balancing areas, with or without market mechanisms for integrating more wind? Isn't that consistent with their

vision of having renewable portfolio standards, or do not see a change in view?

MR. GRAMLICH: We've seen some evidence, and there are a lot of new commissioners that I think -- look, a lot of us had certain views five, ten years ago. But the challenges are different today.

I think a lot of folks are looking at the whole industry differently, including state regulators. These grid operational changes don't necessarily run afoul of what they're trying to do at the state level.

COMMISSIONER KELLY: May I ask Bob? Do you see it the same way?

MR. KAHN: The way you posed the question, I'd have to answer no, I don't really see a change. But let me parse a little bit about what Rob was saying. I think you see a willingness to find value in consolidated services.

In other words, the Ace Diversity Interchange was a huge step, for us in the West a huge step that was really a baby crawling. That was a huge step. That was a service that was consolidated and very inexpensively done.

Not a lot of debate about whether it was worth the cost. There were some people who came in late, sure, but it was very popular. I think we're going to see some other things happen. In the meantime, I made reference in my remarks that there's also a bit of a move afoot to

further balkanize the system, to create additional balancing authorities for special purposes.

I think that's more representative of the direction that we're going. So it's a push and a pull to let people know that you cannot ignore the reality now that it's upon us.

COMMISSIONER KELLY: Bryan?

MR. SILVERSTEIN: I would support what Bob said. I have the wounds from the ten years of conversations about consolidation, and to be honest, I'm not ready to reopen that battle right now. But I believe that we can achieve many of the benefits, as Bob describes, by exchanging services between the Ace Diversity Interchange.

That's a good start. We're now on-line and a participant in that initiative, as we increase our dynamics, as we increase our ability to make schedule changes within the hour, maybe six times within the hour.

I think we would achieve of the majority of the benefits of consolidated BA, without going through the institutional battles, trying to get both investor-owned and consumer-owned utilities to give up its own view as a birthright. We have 17 BAs in the Northwest footprint.

COMMISSIONER KELLY: Have they all agreed to serve the Ace service?

MR. SILVERSTEIN: Not all. A large number have.

Some haven't quite gotten there yet. It's going to take a while for people to put in the technology to do that.

But I think the larger ones are on track. They see the benefits to their consumers of doing that, as well as the benefits across the broad geographic scope.

The next step, then, will be achieving something even larger than the ADI, which deals with the moment to moment squiggles. It's not a major component of the wind challenge, the wind challenge of these changes over 10 to 20 minute periods.

But I believe we can also grab those without actually doing the control area consolidation. I would agree.

COMMISSIONER KELLY: Thank you. Hamid, I wanted to ask if you were willing to give some examples of new ancillary service rules or incentives that RTOs might consider?

MR. ELAHI: In the context of the studies that we've done, there's been a lot of work around the flexibility of the fleet, especially as you move the bounds of generation.

The burden has to be shifted, especially if you don't have much flexible hydro left in your proposal, in your ability to have market rules, the fast start, ramp-down, ramp-up. Those are the things that we project.

In the study we did for Texas, for example, it was mainly focused on ancillary markets, and one of the things that should be included in the new markets, especially with larger penetration, I would suggest that the Commission look at those.

But there's been an exhaustive set of work that goes into it. But that's been an area that has been some very fertile ground for writing the rules.

COMMISSIONER KELLY: Other witnesses talked about faster ramping. Can we accomplish that with our existing generation, and just ramp them quicker, or do we nee different, faster ramping, load-following generation?

MR. ELAHI: It all goes with the degree of penetration. At current levels, there are -- it also goes region by region. The analysis I did looked at it in detail. There are examples in other areas.

A lot of times it doesn't have the incentive to participate, because it does pose more stress on the owners of those assets, and more lost opportunity from an energy standpoint.

But in general, I would think that balancing is a system issue, and learning how to deal with that.

Today, as we go forward, in this regime of higher penetration, it can come in any form. People talk about forecasting as a way to do the balancing. Energy storage

could be another form. Demand response could be another form.

Frankly, the flexible gas-fired generation with their peak unit could very well be. There's new technologies that very adequately support that, generations that could ramp up 100 megawatts in less than ten minutes. That's a lot of ramping in such a short time.

Many of the technologies, I admit are not going to go forward. But it's going to be dealt with now case by case and region by region. We shouldn't look at the strategy of balancing of storage and storage only.

Let's set the rules straight and let all participate in a competitive way, and the best answer will come forward. It's going to be a hybrid answer.

COMMISSIONER KELLY: I assume you would include demand response.

MR. ELAHI: I think I mentioned that. Storage really means different things. It could be demand response. It could be flexible hydro. There's many different ways of maintaining storage.

COMMISSIONER KELLY: Thank you. And then my last question is Rick and Bryan, is New York's dispatch -- you said you had a new dispatch down requirement.

MR. GONZALEZ: And seeking Commission approval.

COMMISSIONER KELLY: It's proposed. Is it

similar to how you're proposing to handle the situation, Bryan?

MR. SILVERSTEIN: Since we don't have a security-constrained economic dispatch, the approach that we are taking is that when we reach 90 percent of our reserves available for inking down in either direction, we will send a signal to the plant operator, and tell them they either need to go back to their scheduling, that they've been over-generating.

Those generators that are furthest outside or in the opposite direction, that's being delivered outside the balancing authority, we will basically change their schedule back to the actual if they're under-generating, and therefore shift the problem basically from the next hour into the current hour.

My guess is it's a different approach, because of the multiple parties, multiple balancing authorities. But I think conceptually the idea is similar to what might come out of security-constrained economic dispatch.

COMMISSIONER KELLY: Thanks.

MR. SILVERSTEIN: Rick, let me know whether I captured that right or not.

MR. GONZALEZ: Commissioner Kelly, the idea behind New York ISO's dispatch down is really that every resource that concerns dispatch can have its marginal

operating costs, represented by an economic offer and that would mean that normally one would expect that renewable resources would have a quite low cost economic offer, in comparison with other conventional types of resources.

There are actually situations in New York where only wind resources are competing against other wind resources for scarce transmission capability.

Those with the lowest economic would be scheduled, and those that would have a higher economic offer would be curtailed on a five minute by five minute basis, depending on other system conditions.

So it's different. But the New York model is fundamental to security-constrained dispatch.

COMMISSIONER KELLY: Thank you.

COMMISSIONER WELLINGHOFF: Mark?

COMMISSIONER SPITZER: Thank you, Mr. Chairman. I'm glad Commissioner Moeller brought up the tax credit issue. I don't think the tax lawyers envisioned that variable generation would have posed a problem with the structure of the Code.

I guess Bob, you pointed out there are other industries that have these tax benefits. Generally, it's based on the investment. It's not based on the production. If you get a dry hole, you take the credit and go home.

It would seem to me that the fix is not really on

the variable generation side. The fix is coming up -- it shouldn't be heavy lifting to allow variable generation, and still qualify for the credit. It's fascinating how changing technology continues to defeat our ability to draft statutes.

(Laughter.)

COMMISSIONER SPITZER: On the balancing authority, I found that discussion very interesting. I guess my question would be what progress can be made, bearing in mind when I became Arizona chairman in 2001, Phoenix had three control areas.

As far as I know, they still have three control areas, despite our best intentions. It would seem to be, I'm not sure there's any political. It's not like the RTO, I don't think. My optimism is strained to believe that we're going to have a new RTO created.

So we have to deal with the system we have, and that would be consolidation and balancing authorities. What practical solutions are there? Are there any tariffs that can be offered to get that done, because I definitely see the benefits of integration through a larger footprint?

MR. NICKELL: I haven't been part of the three times they tried to create RTOs in the West, but I've heard a lot about it.

(Laughter.)

MR. NICKELL: Nothing positive as far as the process they all went through. One thing I'd like to go back to, the joint initiative, and the things they're proposing.

One good thing about it, it's everybody coming to the table because they want to. It's not dragging the horse to water. Everybody's there because they see a benefit to their organization and to their customers.

Through the joint initiative, essentially a mechanism to do sub-hourly transactions between multiple parties, as well as the technology needed to make that happen. That currently is not in the operating control area will happen through that initiative.

So they're picking off some of the benefits of the RTO environment through this initiative, maybe without some of the other things that have caused them not to create RTOs in the first place.

COMMISSIONER SPITZER: Any other ideas on that?

MR. GRAMLICH: I would just say I think that's right. In the Northwest, there are 16 items on the Northwest Wind Integration Action Plan that were agreed to by all parties in that process two years ago.

One of the 16 has been implemented. FERC is not the only decision-maker in this space, of course. So to the others who influence the electric market structure, again I

would say in those two regions, Northwest and the Southwest in particular, to move those processes along and also, you know, if those more optimal solutions are not achieved, then FERC's jurisdictional entities will be coming here for other solutions.

I think it would be good for FERC to hold the line and say look, there are more ways to improve this grid operation structure. Go there first. Don't come here trying to impose charges or whatever other things that utilities will ask for if they don't get those things done.

COMMISSIONER SPITZER: Clark, you brought up some points regarding facilitation of integration, specifically plug-ins, demand response. There are two state commissioners here. What have you seen and I'll also ask my friends from the West, in terms of best practices throughout the country?

What struck you as being successful in coordinating those behaviors typically associated with retail, to facilitate integration?

MR. GELLINGS: Thank you, Commissioner. First, I need to mention one thing that we haven't already touched on, and that's efficiency. Just quickly to say that we can still, whatever you want to choose as a baseline, we can reduce demand for electricity up to 26 percent if we get really serious about it.

If we're going to get serious about it, we've got 22 regulations and standards that haven't ever been fully promulgated. It sounds like that they may be promulgated, based on what I'm hearing in the news and the like.

So let me set that aside quickly and then turn to the others. Let's take the plug-in first. It certainly has an awful lot of potential in these circles. As we discussed, the possibility of using that resource in a variety of ways, perhaps fast-reacting balancing.

But more important maybe in the day-ahead market, we have changed our philosophy as to how we're going to approach the development of that technology.

You might have noticed Ford and GM and so on, we are no longer trying to build a vehicle that isn't built by OEM. We started this with Chrysler, and now we've got all the U.S. Big Three. I'm quite sure you'll see those followed very quickly.

We need some rules that are not FERC rules, but have more to do with things like communication standards. We have to have a common set of protocols with which we can communicate with these devices. It's true for demand response as well.

The utility industry is famous for using 152 different communications protocols, and they're not the same as the 20 or 30 or 40 that the buildings industry uses. So

when we start talking glibly about we want control vehicles and we want interoperability is the term we use of devices across the power system, there's an awful lot of work we need to do, and a lot of it's being done.

I'm optimistic that that will come forward on the vehicles side. The Society of Automotive Engineers has developed three standards that look like they'll make things work. We want the plugs to be the same. We don't want each vehicle to have a different kind of plug configuration.

We want to be able to talk to these devices in a way that allows an intelligent decision to be made, with supervision from the home owner and the right kind of market mechanisms in place.

Some of these resources, demand response being one of them, it isn't yet fully clear what the product is that an ISO or RTO will offer. There are some obviously that have made great strides in this regard.

But we need to coordinate that better. First, before we can do that, we need to make sure that technology works. So we're working with some of the ISOs and looking at ways with which we can use the storage or demand response technologies to effectively control and react, so that they can put into the wholesale market.

It isn't easy to think of controlling something like an air conditioner, with a fast-on, fast-off. The

refrigerant and the oil has to return to the sump before you can turn the thing back on again. You can't do that instantaneously.

You have to allow as much as six minutes before you turn it back on, and I could rattle through each of the technologies. Some are much better in responding quickly than others.

We need to reconcile that, then package these what would be offerings, in a way that we could align it with the wholesale market.

COMMISSIONER SPITZER: Have you seen anything that really jumped out at you Ross in the private sector?

MR. GUTTROMSON: With regard to the private sector advance demos, I haven't really seen a whole lot out there with regard to demand management technologies. Basically, what has to happen is we have to get a market mechanism, I think, in order to actually leverage these demand-side resources.

In order to get that, you have to have control objectives. Whatever mechanism you have to reach out and adjust somebody's HVAC unit has to be adjustable, because you have one objective at 10:00 a.m. and at 3:00 p.m. you have a different objective.

What I'm saying is there's got to a little bit more research and the coordination of how all these

technologies are going to work together.

COMMISSIONER SPITZER: I'd just point out I'd like to thank the Chairman for his efforts, given that the economic reality of just, for example, plug-ins as storage. I thank you all for your efforts.

COMMISSIONER WELLINGHOFF: Thank you, Mark. Commissioner Azar, questions?

COMMISSIONER AZAR: No thank you.

COMMISSIONER WELLINGHOFF: Chairman Schriber.

CHAIRMAN SCHRIBER: One quick question. At the risk of displaying my ignorance over engineering, we talked about must-run wind and solar and so forth, one of the locations for ancillary services with the presence of wind. I'm talking about spinning reserves. I don't know the answer. I don't know if you get those kinds of supports with wind, or some of the other resources.

MR. GUTTROMSON: Yes, that's a great question. I'm not sure anybody really knows the answer to that. What we need to do in fact is we need to go find out exactly how people respond. When we say if we end up with a switch, we say let's price regulate everybody's HVAC unit, the switch.

If we do that in a manner that's going to help fill the void of a cycle of missing wind, for example, to fill that out, how long are they going to play the game? If you want them to play the game long enough, how many are

going to opt out? How many actually will play, etcetera, etcetera.

Then you have to go through all these different analyses and actually I think demos, in order to figure out all that information. Then the technology will, of course, come into play, to figure out at what time frame you can actually deploy all these, which will of course matter about what you can actually affect.

Can you affect regulation, five minute, ten minute, 15 minute, what have you?

MR. KAHN: When you get your first 100 or 150 megawatts in Ohio, which I think is forthcoming, watch out for somebody who proposes that they want to build a single site combustion turbine to back it up. Because that will have a hit on your ratepayers. There are so many other ways that you can successfully integrate wind power, especially a small amount that you're going to have.

MR. SILVERSTEIN: Another observation is don't discount the ability of wind machines themselves to provide some of the ancillary services. The most modern machines are the ones that we call Type 3 and Type 4. They're capable of providing voltage support equivalent to or better then traditional synchronous generators.

Then depending upon the control scheme, could also provide certain levels of reserves. An interesting

question in the industry has to do with contingency reserves. In some parts of the country, when there's an event where wind drops off because the wind comes down, that is not viewed under the current protocols as allowing people to call upon a contingency reserve, calling upon their neighbors.

Typically, the only time that's allowed in some regions is if the wind gets so high that the machines actually disconnect from the system. The high speed cutout, I think we need to rationalize those rules around the country, so that we can call upon this resource that we've already set aside, contingency reserves, to deal with wind issues as well.

MR. PARSONS: There's a large number of grid capabilities that the new modern machines are evolving, and you guys have addressed VAR capabilities for some of the grid codes. It comes down to the question of cost. If you want to provide reserves, you're going to be throwing away energy.

What's the tradeoff? What's the value to the grid? If you want wind machines to have new capability and inertia, it can help us. They can do that at a cost.

The hard thing here is to try and look at those solutions rationally, and look at them on some kind of supply-cost curve, and not access or jump ahead to higher

costs, perhaps conceptually more simplistic solutions when you've got a whole variety of ways to address them.

Then they're going up the cost curve for the consumer's benefit.

MR. GRAMLICH: I think you're also talking about system reserves, not just those provided by renewable generators.

CHAIRMAN SCHRIBER: Correct.

MR. GRAMLICH: It's true when you add variable generation. You can add to the need for more system-wide operating reserves. It's not a reliability issue or shouldn't be. You could put a lot of generators on reserve, and that's just not a very cost-effective way to operate the system.

That's why the forecasting and these other market design changes will reduce the costs. The question is how do we get to the least cost integration? As Bob said and many others have said, there are many more cost-effective solutions than say just putting --

People say you need one to one backup for wind. That is totally false. There are so many other options across the system to integrate wind reliability in these numbers. Three to five dollars a megawatt hour are reflected in many studies for doing that.

MR. ELAHI: I totally agree with everything the

other panelists have said. The only thing I can add is that that we're going into this higher --

Before we put in 100, 200, 300 megawatts of wind, it's very important at this stage to make sure that the new technologies that are going in are able to participate in a real power, reactive power control, such that when this foundation is built, we're not stuck with technology that is not going to be able to support the demands of the system at that level.

This is the time to make sure that the regulation is in place for those.

MR. GONZALEZ: If I may additionally respond, certainly the New York ISO believes that the current levels of regulation requirements have been historically defined by load variation within a balancing area, and at some levels of increased wind penetration, eventually that variability will be overcoming new regulation requirements.

That being said, in New York we're quite excited about not new product of regulation service, but allowing new technologies to participate.

I mentioned briefly this limited energy storage resource, which was not a conventional regulation product supplier, but one that we define in our tariff as being characterized by limited energy storage, or the inability to sustain continuous operation.

These are like flywheel technology and battery storage that can offer the regulation service and only the regulation service for like a 15-minute period. We're seeing those, you know. We expect to have a flywheel project commercial in 2009 of 20 megawatts, by market participants.

I think with the market signal out there and the products, we'll develop those new technologies.

CHAIRMAN SCHRIBER: Thank you, Mr. Chairman.

COMMISSIONER WELLINGHOFF: Pretty much everything I've wanted to talk about has been covered. Just one quick question. The question I had was for you, Bryan. I'm always interested when I hear about new studies. It may be new studies to me, but it may not be new to you.

You talked about a grid study, where you had one done in September in 2009 in the Eastern and Western Interconnect. Could you contrast those studies? Tell me the relationship of those studies to the CSP study and to the Western Governors Association study in the Western Interconnect?

MR. PARSONS: Sure. Our Eastern Wind Integration Transmission study was closely integrated with the JCSP. We've been working closely with members of that group to define our wind scenarios, to be compatible.

The 20 percent studies that they did for their

expansion report utilizes some wind data that we're developing. We're very, very closely compatible with them, and we are taking it a step further by about 30 percent.

So basically, they're closely integrated on the 20 percent, stepping it further up to a higher penetration of wind in the Eastern grid study. We are looking heavily at the operations. That's the aspect that we're adding, is looking at the operability factors, the reserves, the ramping and the geographic diversity of wind, and how all those factors play into that whole issue.

COMMISSIONER WELLINGHOFF: Different construction configurations, like AC versus DC?

MR. PARSONS: On the transmission side, in close conjunction with the JCSP. We're not trying to invent some new transmission expansion build out plans at all.

On the Western study, what we're doing is focusing on the subhourly operation issues within the West Connect footprint. We're looking at the hourly issues for the whole of the West footprint, just because it's impossible to isolate the two.

And the penetration outside the West Connect footprint for wind is slightly less than we're looking at on the East Connect footprint. That's in conjunction mainly with the West Connect utilities. They're primarily members of our Steering Committee.

So we're looking at some very interesting issues there. If you think about hydro in the Northwest, you hear a lot about the issues and constraints there. In the West Connect footprint, we're taking a very close look at the Lower Colorado River Authority, with the hopes that we're not in this kind of situation that are up in the Bonneville, where a Judge is running the river.

That might give us a little more flexibility in the operation of wind in the federal hydropower system. So we're looking at Hoover and some of those other dams and those resources, as an opportunity to even further this idea that wind and hydro might be a very good match.

Physically, operationally, engineering-wise, it just makes sense that you can ramp hydro very quickly, and the hydro has an inherent storage capability as some of you've got the flexibility when it comes to the other rules.

COMMISSIONER WELLINGHOFF: Thank you, Bryan. We're going to take a break. At three o'clock we'll come back for our final panel session.

(Recess.)

COMMISSIONER WELLINGHOFF: Will everyone take their seats, please, so we can get started? For our last panel of the afternoon, we have an examination of operation of the dispatch provisions of the wholesale tariffs and market rules that we're going to examine, that can help us

integrate wind energy.

Our first speaker will be Chairman Alan Schriber from Ohio; Brendan Kirby, who is a consultant with AWEA; Mike Grable, General Counsel of ERCOT. Next is Udi Helman, principal economist with the California ISO.

Next, Marguerite Wagner, Director of Regulatory and Market Policy for PSEG Texas. Then Pravean Kathpol, Director of Market Affairs at AES Corporation. Chairman Schriber, please.

CHAIRMAN SCHRIBER: Thank you very much, Mr. Chairman and Commissioners. The overarching issue here is obviously transmission build out, to accommodate renewables.

As I said earlier, I'm not really sure I had an idea where renewables would take us. There's a lot of considerations.

As I said, it's never been a part of our vocabulary until the last couple of years. The question is, what are we going to have to accommodate, and can we think about doing that now without a definitive answer?

I would note, for example, that distributed generation somewhere down the road, PSLs that operate co-located the load, are distinct possibilities. Again, I'm not real sure where all the technology takes us.

Compounding the challenge, there are states I always concluded have renewable portfolio standards that

mandate that a certain amount of those renewables must come from within the state. I don't know what laws those violate, but anyway, it's for me to answer those questions.

It seems to me that what this merely does is up certain conflicts between the state's resource planning and that of the regions. We need to remember, I believe, that the grid as we know it was constructed and regulated with open, competitive wholesale movements of power in mind.

We don't want to subvert that. I really believe we don't want to subvert that, and now the introduction of electricity that comes from variable and potentially unlimited sources. We seemingly don't have storage capabilities. I know there are some and there are some that are emerging, but it's a stretch.

We have to rely more and more on reliability of ancillary services. That's why I asked that question earlier. I do believe that's critical to the support of what we're going to do. Hopefully, without knowing what it is we're going to be accommodating, we need to have that in place fairly soon.

I think what we're also forgetting is that there are substitutes for transmission in some respects. Renewable energy credits. The vagaries of these new sources of power, whatever they might be, can be addressed, in my opinion, to a very large degree, by rational pricing

mechanisms.

That would be the price response demand, and I'm talking, of course, about that, which is very at the forefront of Ohio and I hope a lot of other places, and that would be the SmartGrid.

The SmartGrid means different things to different people. But for the time being, I'm talking about customers. Not customers by the meter, but more about the system operations.

Price response demand would send the appropriate signals when the wind stops blowing or whatever it is that's renewable vacates us for the time being, prices go up. AMI, through the SmartGrid, will enable us to respond to that, and as prices go up, demand can shift; demand can go down.

Working on my assumption that renewables would be at the bottom of the dispatching queue, AMI will kick in for gas and whatever might be available to fill that void. Given the SmartGrid's deployment as an effective means to counter potential scarcity, in turn means that prices must reflect that scarcity.

It's therefore important to keep moving down the path which you all began with FERC Order 719, which lifts the mitigation rules on generation and generators, such that the price caps can be lifted, for example, in PJM.

In other words rational demand response

mechanisms must work, must be able to work, and can be a substitute for more and greater transmission. For the time being, I would argue that the transmission should be built, could be overbuilt for the purpose of what it was originally intended, and that is for moving wholesale bulk power. With that, I'm finished. Thank you.

COMMISSIONER WELLINGHOFF: Thank you, Chairman Schriber. Brendan?

MR. KIRBY: I appreciate the opportunity to speak today. Wind integration is a cost issue, not a reliability issue. Reliability requirements are given. You could always carry enough reserves or curtail excess wind generation to assure reliability. So we're only talking about cost.

High wind penetration can be achieved at reasonable cost without compromising reliability. Through reliability rules, schedule practices, market structures that provide access to response capabilities of conventional generators and which would produce net load wind variability through aggregation.

Changes in reliability require new wind generation technology. The efficiencies offered by large thermal generators can only be obtained with larger reserve-sharing pools and with adequate transmission.

Similarly, the benefits of low marginal cost

nuclear power could only be obtained with sufficient attention to the reliability of off-site power supply. AWEA supports the NERC variable generation report.

Three areas need attention in order to reliably integrate large amounts of variable generation. Power system. There has to be wind forecasting, flexibility in power system design and flexible generation and responsive load, and significant investment in transmission, both to access the location constrained wind and solar generation, and to provide access to a flexible generation and responsive load.

Wind integration costs can be modest. Studies from around the world, in Germany and other countries and the U.K. and Ireland, have found wind integration costs high. At high wind penetration, wind integration costs are two to four mils per megawatt hour.

In the United States, similar excellent studies in Minnesota, Arizona and California have found wind integration costs in the $4 per megawatt hour range. Wind integration cost impacts can now be estimated reliably.

Wind integration studies in advance can now do a good job of estimating the wind integration cost, especially for large amounts of wind and for high penetrations.

Major scale wind modeling is a great benefit. It provides wind scale data converted to power plant output, as

many wind plants as you want synchronized to historic power system load data, and that's critical, at ten minute time steps for long periods of time, typically for years at a stretch.

This enables me to use the standard utility tools of security constraint unit in an economic dispatch to analyze the integration costs.

Then we come to the importance of industry structure. Studies and experiences in the U.S. and Europe find that utility systems vary widely in their ability to integrate higher levels of variable generation at low cost.

I've provided a handout that describes an evaluation tool that can be used to assess the ability of a balancing area for a region to accommodate large amounts of wind generation, by judging the balancing area's performance and capabilities in 11 important areas.

The balancing area's size or balancing area cooperation, wind generation greatly benefits from aggregation, both with additional wind and with load. Variability is often uncorrelated, so relative variability is greatly reduced when the geographic and electric scope of the operating area is increased.

This could be in the form of balancing area consolidation or cooperation, with subhourly scheduling of the inter-VA transfers. The subhourly schedule means

subhourly markets integration costs are also reduced, when there's a large pool of conventional generators, with the ability to respond to varying power system needs, including wind variability and subhourly markets that clear every five minutes or subhourly schedules of generation in regions that don't have formal subhourly markets, which reduce the need for regulation of the most expensive ancillary services.

MISO, Cal ISO, PJM, and New York ISO have all reduced wind integration costs because they operate five minute markets.

Non-spinning supplemental operating reserves is relatively slow, much slower than the conventional generators. Their reliability needs created by large wind events, most closely match the capabilities of non-spinning and supplemental reserves, which respond within 10 to 30 minutes.

Large wind events often don't quality for non-spinning or supplemental operating worthy of response, specifically because they're too slow. Some VAs compensate for large events by carrying extra regulation, which costs 10 to 50 times as much as non-spin and supplemental operating reserves.

Physical assets. Very briefly, transmission responsive generation and responsive load are needed. The last thing needed to assess wind integration, given these

large balancing authorities with subhourly energy markets and diverse wind resources such as MISO, have reasonably low wind integration costs.

Smaller balancing areas that don't allow hourly scheduling typically have unnecessarily high wind integration costs. Thank you.

COMMISSIONER WELLINGHOFF: Thank you very much, Mike?

MR. GRABLE: Mr. Chairman, Commissioners, thank you for inviting ERCOT here today. You've got a series of very important operational and technical questions for this panel. You've got one at the end that says what lessons can we take from regions that are already incorporating large amounts of wind.

I'm not embarrassed. Political Science and History were my undergraduate majors. So I hope you'll forgive me if I focus on the last question and not the prior ones.

The New York market model and reliability model comes from 1999. It's the unitary oversight of transmission planning and siting that is posted, stamped transmission and cost recovery paid by load on load ratio share basis, and there's no firm or priority transmission right usage, and no generator-specific payments for the transmission grid.

It is an entirely integrated approach. That

gives us benefits in operating the interconnection queue. It is more efficient in the project to move independently and at their own pace.

The first mover in a needed area is not perhaps penalized by being the first mover, which is an important benefit in the ERCOT model. It also included the renewable portfolio standards at Texas and the renewable energy credit trading program for the Texas region, not just for ERCOT.

In 2005, the Texas legislature passed Senate bill 20, which upped the RPS, but also established competitive renewable energy centers. There were three criteria set for this.

They were to simply go out and identify the best wind resources in Texas, which ERCOT has to do in cooperation with the Southwest Power Pool. We hired AWS to do that work for us.

Secondly, we relied on wind developer expressions of financial commitment, whether they would like to invest in wind resources, aside from the need to rely on the existing transmission grid. The third step leads to development of a transmission climate as foremost, beneficial and cost effective to consumers.

Those were the marching orders. The process is moving along. The Texas Commission has now selected the transmission providers to build the new grid overlay, to

include some of the first merchant transmission in ERCOT, which we're very happy about.

You'll see in this slide that I brought with me, and I believe it's Slide 3, the effort that ERCOT and AWS to wind undertook to identify the best wind resources in Texas. On Slide 4, you'll see the study results and the underlying transmission plan.

The PUC took the best wind resources and the best transmission planning efforts and financial commitments and looked at various scenarios, and the investment costs required to build them and selected what you see here as Scenario 2, $4.93 billion of investment in transmission grid, including development of some new areas of Texas that overlay the SPP Eastern Interconnect areas in the Panhandle, some of the best wind resources in the state.

The next slide, five, shows you the ERCOT wind capacity over a year. You can see the enormous jump between 2004 and 2008. Some of it is driven by things like the federal tax credit. Some of it also driven by policy considerations.

I note that the solar folks put out a joint white paper on February 28th with three main recommendations for federal wind power to regulators and legislators. Interconnection-wide transmission planning, interconnection-wide cost allocation and certainty of recovery, and federal

transmission siting.

I can't go home if I advocate federal transmission siting.

(Laughter.)

MR. GRABLE: But if you change that to unitary transmission siting, then I can.

(Laughter.)

MR. GRABLE: Incidentally, I have to mention that we appreciate you holding this March 2nd, which is 173rd anniversary of Texas Independence Day.

(Laughter.)

MR. GRABLE: Slide 6, let's move on very briefly. I want to talk a little bit about challenges. The point of this slide and the green bar, which is -- we think of it as impedance at a high level. We can only get so many megawatts out of West Texas, and it is easier to build wind than it is to build transmission.

Regardless, it has about a 3,200 megawatt transfer capacity on it. At the best, if all the wind is producing, we can only put 4,500 megawatts of it on the grid. What you take away from this is even though we've got over 8,000 installed, we need that transmission to be built before the wind resource is fully utilizable.

There was discussion earlier with GE that I really enjoyed, that I thought was really important.

Essentially, there was a reference to the ERCOT study, two recommendations for us.

One was a minor increase in regulation service procurement, and a consideration as it really ramps up, we consider adding a 15 minute non-spin service. We have, of course, a 30 minute non-spin service.

The last thing I really want to mention, I know I'm out of time. But if you look at the load shape slide that I've got here, you have basically got two variables. We've always dealt with managing the grid. One is load forecasts and the load in real time.

Second is your dispatchable units. Look at that wind bar, the green bar, and now you've got a third variable to manage. It is something to be managed, and that's not the end of the world. It's just a third variable we need to take into planning and actual operation as we move forward.

The last thing I'll mention briefly, the final two slides. One is the actual ERCOT load forecast for such wind production, and we see there is some variability. There will be. We had an independent load forecast similar to the ERCOT ISO as installed. It is learning and improving every day.

The reason I put it in here is compare to the final slide, Slide 9, which is this slide for the German wind experts presentation in Austin last month, which shows

you basically the same thing. We are not in uncharted waters here.

There are tensions, but we need to make them creative tensions rather than disruptive. Thank you.

COMMISSIONER WELLINGHOFF: Thank you. Udi?

MR. HELMAN: Good afternoon, Chairman Wellinghoff, Commissioners and Commission staff. The California ISO appreciates your leadership in organizing this tech conference and the invitation to present here.

We also further appreciate your prior support of our efforts to accelerate wind resource development in California, such as the location constrained-resources initiative to support transmission expansion and revisions to our generation interconnection rules, which have already improved the queue.

Projects have approximately been cut in half in the transmission cluster, and we'll have a status report that I believe was filed late last week on this topic.

Although I won't get into it, in my presentation we also are deeply involved in transmission planning, including Phase 2 of the renewable energy technology initiative, under which a conceptual plan will be presented by the end of March.

As the Commission considers what further tariff and market design changes may be necessary to support higher

levels of renewables, the starting point of course is each ISO and RTO or each region's grid planning and operational assessments that define system requirements associated with the differing renewable resource mixes in California, a round of integration studies conducted by the ISO and other entities has focused on the state's current 20 percent RPS target.

That's largely complete. The ISO's assessment, which can be found on the web, identified the need for additional load-following capabilities, especially in the morning and evening ramps, when wind production tends to be inversely correlated with load ramps.

Also regulation capacity requirements are estimated to almost double in the upward direction, and more than double in the downward direction, depending on the season and time of day.

Finally, the frequency and magnitude of over-generation will increase, particularly during light load high upward periods. Currently, we're conducting unit commitment simulations to further verify the ability of the existing fleet to operate reliably under of these various conditions.

Analyses have calculated integration costs that focus more on operational need. The upshot is that a 20 percent RPS is largely an incremental wind addition. The

Tehachapi case would be feasible with the existing generation fleet, but it does create operational challenges, many of which you've heard about already today.

The system will benefit from additional flexibility, capabilities provided from both generation and non-generation resources, including a fast ramp quick start capabilities, increased operating ranges on generation, additional regulation capability and storage, on-load shifting from peak to off peak.

Facilitating the addition of these resources that provide these capabilities is the current focus of the ISO, a current focus. However, our planning operation challenging that is moving beyond the 20 percent RPS to a 33 percent RPS, embodied in the recent executive order by Governor Schwarzenegger.

Other alternative portfolios are still being developed, but we think that integration requirements will change in a non-linear fashion from the 20 percent RPS.

This highlights the need for standards and other mechanisms, to encourage greater dispatchability from wind and solar resources, as well as much greater storage and demand response capability.

It's important when you look at these scenarios to consider that each region is going to have particular complications. In California, this includes the state

greenhouse gas targets, rules in development for retirement of up to 22,000 megawatts of thermal plants that use once-through cooling, provide load targets and ramping regulating.

Also, it's our mission credits in Southern California that is constraining development. So in any scenario, the California power system is on track to be changed quite dramatically by 2020.

Turning to the role of wholesale markets and facilitating renewable integration, the ISO has laid out an agenda for the next couple of years that includes evaluating the effect of the MRT market design and plan enhancements, such as scarcity pricing, evaluating where the new market products or pricing rules are needed to stimulate needed capabilities, pilot projects for non-generation resources to demonstrate operational capability, market value and ancillary services, and coordination with other ISOs and RTOs to facilitate market design.

Since a number of these topics have already been covered today, I'm going to skip to a couple of my points. I do want to say that the day-ahead to real time structure with additional unit commitments for reliability purposes is a robust framework for introducing improved wind and solar forecasting and also we're testing a grant forecasting tool, which can be introduced at various stages of this day-ahead

sequence.

Let me just turn to ancillary services for a moment. As mentioned, we plan to procure additional regulation capacity, but now on a variable procurement basis by season and time of day. So we're interested in how to elicit such additional capability, including by non-generation resources such as limited energy storage.

Under MRTU, the regulation of prices will now be based on a cooptimization of energy and other market-based ancillary services, and will affect the opportunity costs of not providing energy, sending a price signal that is more attractive to storage devices.

Other regulation is under consideration and may also serve useful functions. For example, although not yet proposed to our board, the ISO has discussed a scarcity pricing design that would include a scarcity price for regulation similar to ISO New England.

Hence, if the higher regulation targets driven by integration would not be met, we would see a sharper price signal sent to the market to attract such capability.

Finally as always, there will be opportunities to collaborate, share lessons and develop best practices, and revising market rules. So the ISO council is currently reviewing market design issues associated with wind integration among its members.

This effort should be useful similarly to the spec conference in discerning how differences in market design affect integration capabilities.

There's so much more to say, but that concludes my remarks. I look forward to answering your questions.

COMMISSIONER WELLINGHOFF: Thank you. Marguerite.

MS. WAGNER: Thank you for the opportunity to participate today. I'm Director of Market Policy and I'm speaking on behalf of the PSEG Company. PSEG owns approximately 14,000 wind megawatts of generation, both in the Northeast, PJM, the New York ISO and ERCOT.

We have two. One plant is located in the region that has been designated as a competitive renewable energy zone. That's given us valuable insight into the CRES process. Large amounts of wind generation have been interconnected to the grid.

I will focus today on the lessons we have learned from that experience, and how they can be applied to other regions of the country. We believe that renewable generation can and should play a role in the generation supply portfolio.

In fact, PSEG is developing both wind and solar projects. From our perspective and experience, large-scale interconnection of renewable resources must be implemented

with two critical objectives.

First, grid reliability must be maintained through the establishment of specific operational and performance requirements. Second, steps must be taken to ensure that market pricing and market rules remain non-discriminatory, transparent and efficient, so that both locational and resource diversity of generation supply is achieved.

Renewable generation needs significant support in order to ensure that it functions as a viable part of the grid. For the last few years, as part of the CRES process, we've been studying and developing plans for a significant build-out of transmission to effectuate the interconnection of 18,000 megawatts of wind, 8,000 megawatts of which is already under ground.

There's approximately 5,000 megawatts of this having come on line in the last two years. Ground work for construction is already underway by various construction entities.

It's first necessary to load all costs necessary to interconnect these resources. The CRES model has succeeded in the goal of large-scale development and integration of remote wind resources.

At the same time, there have been both reliability-related and market-related challenges associated

with this large-scale wind development. We continue to address these challenges in ERCOT.

First on the Appalachian side, the intermittent nature of wind resources is a challenge, as one must implement a different type of contingency planning, one that involves 7,000 megawatts of wind rather than the more typical scenario of the few large baseload units or a transmission circuit.

Second is the need for provision of more advanced meteorological data to the ISOs. Data on temperature and humidity alone is insufficient. One must also obtain data regarding wind speed and estimated wind generation output. We have worked in ERCOT to obtain and utilize this type of advanced weather data for wind forecasting.

Third, ramping control is required. These resources increase output as wind speeds increase, and finally and significantly, renewable resources often do not provide reactive and voltage support to the grid, and as a result, there will always be a need for generation resources located in close proximity to load that can provide such support, and they must be compensated accordingly.

Large-scale renewable integration also poses challenges in ensuring that markets continue to provide appropriate market signals.

Specifically, large scale renewable resource

interconnection has the potential to mask price signals necessary to ensure the provision of required ancillary services, and it has the potential to mask signals to ensure resource adequacy, both locational and supply diversity, particularly in the ERCOT region, where there is no capacity market.

We found in Texas that we support a least-cost dispatch model, rather than a priority-based dispatch model that would look at resource types or on-line dates as producing the most efficient and transparent results.

No policy is required that siting signals provide the most economic development by new generators. There are many lessons that can be gleaned from our experience in ERCOT with the development of renewable generation, including offshore resources, it should be promoted as part of an overall generation supply strategy.

Such development must be coupled with other strategies that recognize the unique nature of these resources. For example, we need to examine and encourage technologies such as batteries, compressed air and pump storage that will work as generators hand in hand with wind generation, to make it available during the peak period.

We need to recognize that traditional generation resources are needed to provide reactive capability and to satisfy operating reserve requirements. We must compensate

these resources appropriately through the retention of transparent, non-discriminatory market rules.

We need to require ramping and capability for wind, for which ERCOT is ready, a topic ERCOT has already begun to address. Further, we need to examine the true all-end costs of large-scale integration of remote renewable resources.

Such costs include the cost to interconnect these resources to the grid, the cost per mile of backbone transmission that will move the wind and the cost of the off-ramp subtransmission and distribution network being built to feed off the new backbone transmission. Is the cost necessary to satisfy ancillary reserve requirements and reserve margins?

Finally, we need to recognize that large-scale renewable resource interconnection needs to be part of a regional planning process, so that the resources can be properly integrated. ERCOT's experience has demonstrated that large-scale wind development can be accomplished.

There are significant challenges, however, to integrating these new resources that cannot be ignored. Thank you for the opportunity to participate. I look forward to the questions. Thank you.

COMMISSIONER WELLINGHOFF: Thank you, Marguerite. Pravean, please.

MR. KATHPOL: Good afternoon. Thank you for the opportunity to participate. I'm going to expand on the themes of variability and flexibility that have been dealt with on this panel and the previous panel, and specific ways that energy technologies can offer additional flexibility of the grid.

Variability exists on the electrical grid in various forms, such as loads, which continually deviate from forecasts and generation resources such as wind and solar, which rely on variable resources, and are subject to forecast errors.

To manage variability, grid operators require flexibility, which also already exists in various forms, including transport generation and controllable loads.

As variability is bound to increase with increasing proportions of renewable generation, energy storage resources offer a new source of flexibility to the grid.

There is no doubt that this additional flexibility is welcome and can serve to help manage increased variability. We've presently faced challenges in exactly how to accept this enhanced flexibility through existing and future market mechanisms.

Today's flexibility is largely managed through existing ancillary services markets. Regulation assumes

moment to moment imbalances between load generation and unscheduled interchange by dispatching generators up or down within the short-term limits of the ramp rates, in order to maintain a stable system frequency.

Advanced energy source technologies possess certain properties that result in superior performance in this application on traditional generators.

The fast response, speed of advanced energy source technologies offers digital control of resources, the ability to demand injections and withdrawals of energy at precise megawatt levels, and for those levels of output or absorption to be instantaneously met.

The superior response speed can essentially serve as an Ace eraser for the good operator, instantly reducing the need for regulation resources to respond, resulting in system and customer benefits through reduced fuel use and associated emissions, reduced O&M burden on the generation fleet, and increased generator life.

By rapidly withdrawing and injecting energy from the system, high efficiency advanced energy resources effectively recycle excess energies for use moments later, when it is again needed.

These two properties of digital control and high efficiency enable advanced energy source technologies to provide regulation to the grid, in a manner that is better,

faster and cleaner than it is provided today, while offering the much-needed flexibility to enable the integration of renewable resources.

Contingency reserves offer another form of flexibility to the grid, by keeping a set of operating generators available to ramp up their output, in the case of a system contingency such as the sudden loss of a generator or transmission line.

In this application, advanced energy source technologies provide an advantage through their property of programmatic response. Being able to specify the shape of the resource's contingency response through software controls allows that resource to provide an ideal response to systems contingencies, rather than simply the response a generator may provide as a function of its settings or ramp rate.

Load-setting has proved to be somewhat effective in this area. Energy storage has the potential to be even more effective, since its response can be programmed and shaped in the ideal way to help restore grid stability and can do so while avoiding the economic costs of load curtailments and the opportunity costs of underutilized generation.

AES is developing a commercial-scale energy source project in its application in Latin America, actually

in Northern Chile.

We've been working with the system operator there on the ideal response to grid contingencies, and working with our suppliers to develop and program the algorithms involved, with a focus on response to rapidly-changing system frequency.

This has given us the exciting opportunity to introduce self-healing properties to the grid. Existing U.S. reserve markets do not yet have a widespread mechanism to value the operational and reliability benefits of programmed response, but the opportunity exists to incorporate such concepts in the near future, as our sources of flexibility expand.

With increased wind penetration, grid operators are going to be facing and already are in some places a level of variability that challenges the flexibility offered by the existing generation fleet's ramp rates.

The relative scarcity of higher performance flexibility necessary to compensate for these large and rapid ramps calls for innovation in how flexibility is offered and valued.

An opportunity exists, when discussing system ramping requirements, to draw upon lessons from existing ancillary services, including lessons learned about the flexibility of advanced energy storage technology.

Taking advantage of the digital control and programmatic response capabilities of energy storage when addressing the challenges of system ramping requirements has significant potential to provide the flexibility for the low carbon scenarios being proposed today. Thank you.

COMMISSIONER WELLINGHOFF: Thank you. Questions?

COMMISSIONER MOELLER: Mr. Grable, I'll start with you. I'd like your reaction to what Marguerite said, in terms of the situation in ERCOT.

MR. GRABLE: I'm very glad you asked that. I was running a bit short on time. One thing I'm really glad she mentioned, and I'd like to second is you've got to be very careful. When so much is market-based in ERCOT and other RTOs, to very much the same extent you've got to be careful to examine not just reliability impacts but market impacts.

PSEG has a great plant that's in the area of West Texas. It's highly affected by wind. Those are the things we need to keep in mind. We're very lucky to have the representation on our technical advisory committee.

I think the broader point I'd like to make is that load shape that I provided to the Commission, there are units at the lower end of that that is not used to being backed down, and there's wear and tear on other aspects of those units that could be impacted.

People think it's a great idea to have less

natural gas on the margin in ERCOT than it is. But if you're going to be out of gas and trying to manage reliability, storage is great but it's not in operation yet.

You're going to be looking at some different impacts on units. You've always got to be sensitive to that.

COMMISSIONER MOELLER: Scenario 2, I think, or 2A, that's giving a preferred build-out for CRES, the time line on that and when that's finished. Does that cover you for the next 20 years?

MR. GRABLE: Actually, the plan is to have that capacity, including all the transmission lines through delivery, the middle of the coming decade. 2013 would be enormously optimistic. 2014 is still optimistic, but somewhere in that range. It is a fairly quick process in ERCOT to get transmission built once you have the plan.

There is a little bit of discussion with the Texas Commission, on how you will build such an enormous addition to what is, of course, a 63,000-megawatt interconnect all at one time. But there is a plan to do that very aggressively.

COMMISSIONER MOELLER: So if you could put one of the seven flags of Texas, one from the Republic of Texas is flying right now. What advice would you give the rest of us for planning major renewable-related transmission in the

Eastern Interconnect or the Western Interconnect?

MR. GRABLE: I think at this Commission and the comments I've read from the electric leadership, you're focusing on exactly the right issues. There are some enormously beneficial policy goals here that are also challenges.

There is a reason that the structure was easy to develop in some ways in ERCOT, but there are other ways to achieve the results. I feel confident that you'll get there.

COMMISSIONER MOELLER: Marguerite, do you have any reaction to what Mike had to say?

MS. WAGNER: Yes. A point that was made by a number of panelists, Mr. Kirby in particular, the door is open to the service. We just assume generation will be available for ancillary services, neglecting the impact of the market.

The slides that Mike had really show typically high wind levels coincide with low load levels, meaning most of the generation is back down to zero already. So you'll get into a situation where there's only the base load generation.

If there's a wind event, and that winds trips off line, that generation ramping capability might not be what the system needs. So there's a lot of sophisticated work

and thought that everybody is doing, to try to figure out what the optimal mix of generation resources is.

But that won't occur without the money on the table. So we can't just assume that it will be there. Also, our regional planning process really facilitated the CRES process. It started really with the staging and outage management that we're going to have to undertake, to accommodate the cut-in of these new resources, the new transmission lines.

COMMISSIONER MOELLER: It was a good perspective, and I'm glad we were invited to hear that ERCOT focus. I just have one other question. Udi, now you've moved from the halls of FERC to the halls of Folsom, California. Can you put your FERC hat back on and give us any observations on this larger issue? I didn't say it would be easy.

(Laughter.)

MR. HELMAN: From my years at FERC, I'm always excited by chances to compare notes among the different ISO markets. Obviously, there are a fair number of ISO and RTO markets, and I think they will assure their capabilities in this context of renewable integration and climate change policies.

So, you know, in California, there's a need to start MRTU and demonstrate its capabilities. I think everyone is interested in seeing how that will figure in to

the state's more centralized approach to dealing with the renewables problems and the portfolios that need to be built around renewables.

So that's where we are. In the meantime, discussions like today with the New York ISO explaining their approach, to thinking about how to value decremental energy from wind resources, that's a subject that we're interested in as well under a different set of constraints.

The ISO-RTO council has put, you know, when you look at each of the different ancillary service markets in different ISOs and RTOs, there are different rules. The prices mean different things actually. These rules have implications for technology, including storage technology.

So going through that process of understanding the market design implications in the different markets, I think that's something FERC is obviously well-placed to do, with its national scope. The IRC is well-placed to do that in a bottom-up way to inform that process.

COMMISSIONER MOELLER: Good. I'll just have some closing comments. I particularly appreciate this panel as well, and most notably our state colleagues who are with us today. Thank you, Mr. Chairman.

COMMISSIONER WELLINGHOFF: Questions, Mark?

COMMISSIONER SPITZER: Thank you, Mr. Chairman. It was interesting, the discussion of transmission. So we

go back. Commissioner Moeller's been talking about transmission for a long, long time. We've come full circle to Panel 1 and the successes in Texas with regard to your renewable zones, CRES, California's got the RETI. New York, not as much attention.

I think the transmission but certainly the white paper and the tariff filings, you know, the New York ISO has been attending in a different realm. Texas, California and New York have in common the fact that there's one political constituency which is much easier to deal with than the multiple.

So I guess Lauren's worked so hard on MISO. So much work has gone into PJM, ISO New England, at the state level meetings. What advice could you give to the multiple jurisdictional ISOs that you've got in your state regions, that have oftentimes conflicting goals, so that you could have goals where it seems everybody wins?

MR. GRABLE: RETI answered that question. That's for you.

(Laughter.)

COMMISSIONER SPITZER: Actually, it's for the Political Science and History major.

(Laughter.)

MR. GRABLE: I will start by simply agreeing with you. You know, a recommendation on federal siting

authority. I think we all know how certain state commissions are likely to feel about that. It's a difficult challenge.

The most important thing to do is simply to set the policy goal and to decide that the best framework that achieves the policy goal while maintaining all of the other important aspects, a build out of renewables is the policy goal.

There will be winners and losers from the acts that become necessary to implement that policy goal, while we also maintain market and reliability of course.

COMMISSIONER SPITZER: But your people bought into that, and it seems that in Texas, there was an initial thrust to achieve these goals through market mechanisms. You had upward pressure on prices, but you bit the head off the snake. Now, you've got the ability to enjoy the benefits based upon the market signals.

MR. GRABLE: Sure, absolutely. Retail prices in Texas have been cut in half in the last year, as natural gas prices have fallen. There was an article with a tone of wonderment in the Abilene paper today that prices are so far down partly because of a tradeoff between generation and load in that respect.

To be honest, in the regulatory context, no one in Texas had to give up any of their current authority, in

the governmental regulatory context, to make these things happen. I need to be frank with you about that.

COMMISSIONER SPITZER: Nevertheless, you've got Udi and Marguerite as well. That sounds like this is going to involve a sales effort to the constituencies. You both want to see evidence that they're going to be demonstrable benefits.

Maybe they're skeptical; maybe not. You'vegotten some demonstrable benefits. So in what manner could those be articulated, starting with the other ISOs maybe?

MR. GRABLE: To the extent you talk about the cost of building transmission and of maintaining reliability, ancillary services and other payments and costs, I think that you have to focus on the fact that what you're describing is an investment.

It's not a cost that goes down a black hole; it is an investment in cheap, clean, efficient generation. That is something that can very easily get lost in Texas, where people focus on 4.93 billion of transmission costs, and not the expectation that market prices will be lowered many, many times over in that amount.

MS. WAGNER: I agree with Mike, although I do have to say that the CRES process in Texas was not underpinned by a cost-benefit analysis. We do support that. The Commission rule in the legislation defines that it has

to be done in the most beneficial and cost-effective manner to consumers, and we really haven't explored what that means.

I do think there's a price for a cost-benefit analysis, particularly in looking at the construction of the transmission backbone, as well as the off ramps and the underpinning of the voltage transmission system, as well as what it means in terms of the capacity factor for those lines.

Given that renewables tend to be intermittent resources, as well as the energy benefits to consumers.

COMMISSIONER SPITZER: Finally, for Pravean and Brendan, are there any particular tariff or operational rules that you would suggest, that jump out?

MR. KIRBY: Either subhourly markets or subhourly schedules. You don't have to have markets, but subhourly schedules, both for the generation, all the generation, will be in a VA, as well as schedules between VAs. It's just incredible to me how long it takes for people to develop the subhourly schedules. That is one.

The other one is be sure you are able to use things like non-spin and supplemental operating reserves, rather than regulation to compensate for the increased variability and uncertainty that wind brings.

The third piece, you always want to aggregate

wind with the load before you go and start to deal with that variability. So you don't want to use historic solutions or the non-spin solution or any other ancillary service solution on any individual asset. You always want to aggregate it together.

MR. KATHPOL: The first step on the regulation side, a lot of that's already in place, building on the work the Commission did in Order 890, to get a lot of those changes teed up. A lot of those are still on their way.

So I guess expedient work by the ISOs in finalizing what they're proposing and the expedient approval of those tariff changes would definitely be a big step in storage getting its foot in the door, to help provide more system flexibility. Beyond that, I think taking a holistic view.

Previously, the question was to be what flexibility can I provide, given the constraints of my existing set of resources? But given how dynamic these new resources are, the question should be for the system as a whole, what flexibility do I need to incorporate in the variability that's coming?

And I think that's a step that hasn't been taken yet. When that's taken, it will come not only with the things I mentioned, in terms of unique characteristics of storage and digital control, high efficiency and

programmatic response, but also other characteristics of demand-response and characteristics of the variable resources themselves.

COMMISSIONER SPITZER: Thank you.

COMMISSIONER WELLINGHOFF: Thank you, Mark. I'm always going to remember what Einstein said. Physics is easy; politics is hard.

(Laughter.)

COMMISSIONER WELLINGHOFF: Commissioner Azar?

COMMISSIONER AZAR: At the very end, Udi you said during your prepared remarks, I think you said differences in market design affect integration. But then you said you didn't have any time to talk about that. I would love to hear.

MR. HELMAN: What I said was that the effort to understand how the ancillary service markets were structured, and the different ISOs and RTOs would help flesh out some implications for eliciting additional capabilities on the system and the new technologies.

So for example, a limited energy storage device that is not providing energy, that has met zero energy, is really only getting paid regulation. There are three or four different ways regulation prices are calculated in ISOs and RTOs, with different implications for the revenues.

The other ISOs and RTOs are probably saying this.

Why is he opening his big mouth, getting FERC involved in this? But that is the difference. Part of, I think, what has to be evaluated going forward is whether there is any interest in examining these pricing methods or not.

That's sort of in the grand sense a cost-benefit decision. So that's what I was alluding to, and of course there are also differences in operating reserve margins and how prices are set.

COMMISSIONER AZAR: Thank you. One more question. Mr. Chairman, you talked wonderfully about the importance of SmartGrid, and how do you incorporate that. In linking this session back to the first session concerning regional planning, do you have thoughts on how best to capture the opportunities that SmartGrid could bring us into the region?

You've talked a lot about the fact that you don't know what technologies are coming up, and you were about to embark upon a lot of expense. I'm trying to figure out how to bridge the two worlds.

CHAIRMAN SCHRIBER: As I said, SmartGrid means different things to different people. There's the consumer side, there's the operational side, and I think obviously when we're talking about regional analysis, we have to talk about the operational side.

In fact, I would take it so far as to make it a

FERC initiative, if you will, to promote that SmartGrid, insofar as it does give us the tools that we need in our tool box to address a lot of the problems that may or may not arise, because of the introduction of all types of generation.

You know, as one coming from Ohio, I remember vividly unfortunately after August 14th, 2003, I found myself in front of Congress explaining or trying to explain how we can improve things. So I'm very careful about anything in my mind that could corrupt the grid and the reliability of the grid.

I see SmartGrid as working very, very smartly, if you will, with the grids that exist today. If a grid is built for reliability, and again what it's intended to do is move large bulk transfers of electricity.

So I think the SmartGrid can easily be a regional initiative if not a national initiative.

COMMISSIONER AZAR: Thank you.

COMMISSIONER WELLINGHOFF: Thank you. Pravean, I have a question or two regarding your discussion. In fact, I wanted to commend the California ISO. It sounds like development of a very innovative regulation market design, and various alternatives in the regulation market that sound like they may have the ability to provide some multiple options for different types of regulation services,

especially from the demand side sector.

But with respect to spinning, we hear of markets. You indicated that some of those markets that I assume certain RTOs and ISOs don't value the queue, could you kind of explain that in a little bit more detail to me please?

MR. KATHPOL: What I was simply saying is the type of work that we've been doing in Chile, a system that's much more integrated. So we had the flexibility there to design the ideal response with the operator, a small consortium of generators, whereas as the markets exist today in the U.S., which is fine.

Spinning reserve is spinning reserve. It's not -- there's no additional value on the shape of the response. I think overall it's not a high- priced market, so it's not one that services resources are going to be attacking very aggressively.

My larger point was by taking a step back and looking at what the resources we had that they are capable of, we may be able to improve the responsiveness to the grid area, such as spinning reserves.

COMMISSIONER WELLINGHOFF: So you're utilizing your storage in the U.S. currently primarily for the regulation market; is that correct?

MR. KATHPOL: Right. We're targeting the regulation markets. We have a couple of pilots, scaled

demonstration projects, and we're developing a pipeline of commercial scale projects.

COMMISSIONER WELLINGHOFF: I'm trying to make sense of how much those regulation markets are integral to and necessary for the integration of wind versus spinning reserve markets. I keep getting different information from different sources.

One source indicates that it's really spinning reserve that wind integration requires versus regulation, although I also hear that the more wind we integrate into the system, the more integration services we require.

Do you have any comment on that? Udi, you may have a comment on that as well.

MR. KATHPOL: We're big fans of the Cal ISO report that Udi mentioned, and it shows, as Udi mentioned, that they're expecting the regulation, where they procure, to double. That seems to agree with some things we've looked at.

Really, what we may not be entirely -- what may not entirely be encapsulated by the definition we have of the ancillary service products that exist, it's really the potential to respond and the speed of response, which right now exists in the aggregate ramp rates to all units that are available to respond.

The ones of those that are actually operating at

the time that they're needed. So we're going to approach the point, especially in the areas where a wind resource may be dropping off during the morning ramp period, where you already have units ramping up and your ramp is going to be --

You're going to reach someone that's of your fleet capability. So you may use right now regulation, resources or spin resources to do that, but it's essentially a new form of responsiveness that may not entirely be defined by the existing markets.

COMMISSIONER WELLINGHOFF: That's where you're talking about more flexibility here, demand-side resources that can provide this capability. There may be value to that, which we're not capturing.

MR. KATHPOL: Right.

COMMISSIONER WELLINGHOFF: Would you like to share a comment on that?

MR. HELMAN: A slight correction. The regulation increase in this report is not doubling. It's doubling in some hours of the year. It's a seasonal hourly basis, but the overall requirement on average for 20 percent RPS is from 350 to about 450 megawatts.

So you need that additional capacity for certain hours. So the regulation range you need in certain hours could more than double in the upward and downward

directions. In terms of the relationship of reserves and regulation, I think Brendan really articulated a lot of those relationships in his talk.

It depends how you're defining them, and when you can trade upon them. There is some discussion for different reasons about the need for asserting the reserve product, that would provide some of the capabilities that Brendan was describing to fill in the back end of ramps.

But that process has been to cover existing 30-minute contingencies under order of FERC actually, and not motivated by renewable integration. So there's a whole suite of questions to ask here, and decide how to divide up the products as needed.

COMMISSIONER WELLINGHOFF: Brendan, any comment on this ancillary services questions of spin versus regulation?

MR. KIRBY: Regulation is a funny service. In a sort of theoretical way, it's supposed to take care of unit to unit ramp and variability. Everything is happening faster than your markets can operate. You should be a energy-neutral service, so it should just be going up and down equally, ideally aimed theoretically at storage.

It's fantastic. It also turns out that you can do more than that, the way you procure regulation from generation. If you're a system operator and you want a reg

up a unit and hold it there for eight hours, you can extract energy out of it.

It's ultimately flexible. It happens to be very expensive. So that's a real expensive way to get energy. But ultimately if you're strapped for anything else, you can use regulation, assuming you're very careful about it, it gets back to what is it that you're really trying to get?

You might say well, I'm going to get this or I am getting this response out of regulation. But it doesn't mean it's really the minute to minute short zero net energy capacity service. We have to be very careful there.

That then couples over to the more well-defined service in the contingency reserves, for the spin and non-spin and supplemental reserves. Often we find that the big wind events are too slow to qualify to deploy the contingency reserves, which are cheap, one-tenth to one-fiftieth the cost of regulation.

You find you can say well, this contingency reserve service matches what I needed for wind much more. But the rules don't allow me to use it, so I'm going to use the very expensive regulation service, because the rules for regulation don't restrict. I can use it for anything. I can extract energy out of regulation if I want.

COMMISSIONER WELLINGHOFF: One other thing Brendan here. A system evaluation tool, which I really

liked, that you provided us, is this available on the web? I thought it was great.

MR. KIRBY: It can be. I will be publishing that in a couple of weeks.

COMMISSIONER WELLINGHOFF: What I extract out of this evaluation tool, we said it over and over again, but ultimately the best places to integrate wind at the lowest cost are large RTOs with spot markets basically.

MR. KIRBY: Yes.

COMMISSIONER WELLINGHOFF: I think that's all the questions we have with that. Comments? Closing comments from our colleagues?

(No response.)

COMMISSIONER WELLINGHOFF: I want to thank the panel very much. We'll have our closing comments and wrap it up a little bit early perhaps. Phil?

COMMISSIONER MOELLER: Thank you, John. As I said earlier, I appreciate the leadership you showed earlier, the staff and our variety of panelists today and our studio audience and those watching at home, everyone paying attention to these issues.

You know, our focus today was, of course, integrating renewables into the grid. Yet I think everybody or just about everyone noted they would support expanding the transmission grid, making it more robust.

Although I appreciate the calls, particularly from the first panel and I agree with it, that it would be beneficial to have a plan for the country on renewable portfolio standards on how we're dealing with carbon.

If you drilled down how we're dealing with market congestion, regardless of whether we have a plan or not, I think more transmission and a more robust transmission system is as close to a universal solution, that at least gets us part of the way toward whatever problem you want to solve.

With that again, I thank everyone for their efforts, particularly our state colleagues who are with us today.

COMMISSIONER WELLINGHOFF: Commissioner?

COMMISSIONER SPITZER: Thank you, Mr. Chairman. You and staff did a great job putting together these panels. That was as good a presentation as I've seen in my tenure in Washington, and what I was particularly pleased to see was the degree of consensus, on issues that have proven to be very nettlesome.

I would also agree with my colleagues and those on the panels who have indicated that it's important to move forward. We know there's a debate at the federal level regarding the absolute nature of the ultimate goal.

That doesn't mean that we have the luxury of

dawdling on the way to that goal. One of my favorite oxymoronic inconsistencies is from the United States Supreme Court in 1954 on desegregation, "all deliberate speed."

Ultimately, the panelists may give us some ideas. They'll give us some ideas on how to increase deliberate speed.

COMMISSIONER WELLINGHOFF: Commissioner Azar, any remarks?

COMMISSIONER AZAR: I just wanted to thank you for inviting me and giving the states' perspective. Obviously, we do believe that keeping the states in mind going forward is going to be key to that and we've gotten some valuable insight into how best to move forward. Thank you very much.

COMMISSIONER WELLINGHOFF: Chairman Schriber?

CHAIRMAN SCHRIBER: I just want to say that you all have been in our positions also, and you know that we have to cover a lot of ground, telephone, gas and so on.

It's interesting, it's illustrative, and it's a great learning experience to be here and hear firsthand, rather than watching on the webcast or read it to hear. It's a good learning experience, and I appreciate the opportunity to be here and to participate. Thank you.

COMMISSIONER WELLINGHOFF: Thank you. I'm going to thank all the panelists today. I thought we had stellar

presentations and some tremendous information we can learn from. I also wanted to indicate that I believe there's no question that this will be the first in a series, because we have a lot of issues here to deal with.

There are 8,353 megawatts of wind energy that was put on the grid in 2008. It's not going to stop, despite what the Congress may do with respect to RPS. Although I expect we're going to get something on either the national carbon cap and trade. That's accelerating. So we need to make sure we have ways to efficiently and effectively integrate these resources to the grid and do so reliably.

That's the key to make sure the reliability can be maintained, efficiency can be maintained, and we can meet the national and state goals all of us are trying to achieve. With that, thank you all.

(Whereupon, at 4:10 p.m., the hearing was concluded.)