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U.S. EPA
State Climate and Energy Technical Forum

Moderator: Julia Miller
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2:00 p.m. ET

Operator: Good afternoon. My name is Cassandra and I will be your conference operator today. At this time, I would like to welcome everyone to the U.S. EPA State Climate and Energy Technical Forum. All lines have been placed on mute to prevent any background noise. If you should need assistance during the call, please press star then zero and an operator will come back online to assist you. Thank you.

And now, I would like to turn the call over to Julia Miller. You may begin.

Julia Miller: OK. Thanks Cassandra. This is Julia Miller from EPA. I want to thank everyone for joining us for today's Technical Forum on clean energy and transmission planning in the Eastern Interconnection. We wanted to do today's forum on this topic because transmission is so key in not just providing reliable electricity but also in helping states meet goals such as renewable energy standards and clean air standards. There's been a lot of activity recently in the process going on in the Eastern Interconnection, between the Eastern Interconnection States' Planning Council and then also in the Eastern Interconnection Planning Collaborative. And I know that probably sounds confusing, and they sound similar, but the speakers today are going to talk more about what each of these groups are doing and how their processes are impacting clean energy and clean air policies. I would also like to thank the speakers for taking the time to be with us today. We really appreciate it.

As Catherine Morris has posted online, you can see a link to all of the background documents at epatechforum.org, which is also listed at the bottom of your agenda.

We're doing our next webinar sometime in late February. We haven't set a date yet but we should have that out to everyone in the next week or two. The topic will be EPA's eGRID (Emissions and Generation Resource Integrated Database). It is maintained by EPA and it is a source of air emissions data for the electric power sector. We will talk about what's in the database and how states can use it to help them with their clean energy and air quality planning.

With that, I am going to hand it over to Catherine Morris who is from the Keystone Center. She is our facilitator today and she'll introduce the speakers and get us started.

Catherine Morris: Thanks a lot. This is Catherine and before I tell you a little bit about the speakers and their background, let me just give you a couple of tips on using the toolbar that you have on the webinar so that you can interact with our speakers. The intention of these forums has always been that you have the opportunity to learn from the experience of the speakers and ask them some questions about the applicability of what they have experienced in their work to your particular situation, as well as the opportunity for you to share some of your own experience on this topic.

So your line was muted when you joined as the operator explained, but you can use the toolbar that allows you to type in questions under the Q&A in the question box. So you want to type the question in. It will come to me and I will verbally transfer those questions over to the speakers. We will take clarifying questions after each of the speakers for a few minutes and then hopefully we'll have at least 15 to 30 minutes at the end of the call so that we can go back to some of your unanswered questions. We typically do not have time to answer everything. There are a lot more questions coming than we have time to respond to, but we will share on the website the contact information for each of the speakers so that if you want to get in touch with them directly, you will have an opportunity to do that after the call.

I got a message saying that some people are having difficulty with the link that is published at the bottom of the agenda. Perhaps if you start with just the www.epatechforum.org and maneuver from there, you will see they will take

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you to all the documents from the past forums, and you just need to look for the one for this particular date.

So I know that some of you are still coming to the audio portion of this call. It takes a while with the operator-assisted call to get everybody on line but we have a hundred people on the webinar so far. So we do want to get started and I will introduce our first speaker, Marya White. She is going to give you an overview and clear up some of the confusion about some of the terms and the acronyms. Marya, as you can see, has been serving as the director for the Eastern Interconnection States' Planning Council, which is the states' group that is working on its Eastern Interconnection project. Before she was appointed to this current position, she served in a number of different capacities in the energy world over her career. She worked for 20 years with the State of Minnesota in both utility regulation and regional planning, and, before that, she worked with the Natural Gas Pipeline on federal issues. In addition, she also did some work with electric and gas utilities. So she has seen it from a lot of different angles and I think she will be able to do a good job of explaining and giving you the big picture before we move on to our other speakers. So Marya, we will bring up your presentation and see if we can get you started.

Marya White: Thank you, Catherine, and thank you for the opportunity to present today. Hello everyone. Thank you for the opportunity to explain what the Eastern Interconnection States' Planning Council – or, as we affectionately call it, EISPC – is all about. First of all, why do we do this? What are we looking at? Why are the states interested in looking at transmission planning? Why do this now? Well, the United States operates on electricity – and I know that is an obvious statement to everyone, but there is a lot behind it. As all of you in the audience, working with clean energy, or for issues regarding clean energy, we know there is a lot behind generating electricity and getting it to customers for their usage, and the way they are using electricity.

Next slide. OK, thank you. This is probably outdated but it gives you a good indication of how electricity is used and where it is used throughout the United States. I found this map pretty telling. It talks about population, but I think, if you look at it, population kind of runs parallel – all people use

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electricity; manufacturers use it; businesses use it; and all of us use it on our everyday life. So I think it is a good picture of electricity in the U.S.

Next slide. So, why look at this right now? First of all, electricity in the United States demands three things (and I'll take this out of order, actually). First of all, we have "affordable." Electric rates, energy rates take up a material percentage of people's bills every month. And especially [during] the recession, the way they are, people are very attuned to how much they pay for their energy. Second of all is "environmentally sensitive." You all in the audience work with this every day. You know better than I that this is more important than ever. Looking at, for example, the EPA's own rulemaking, as well as the President's state of the union address last week, where the president called for the development of a clean energy standard -- environmental issues are at the forefront more than ever before.

Now, I'll take the last one, "reliability," by kind of showing you an example.

If you back one slide to that map and look at the most lit-up section of the Eastern part of the United States, which is the seaboard around New York, New Jersey, Massachusetts, surrounding there and then if you move forward two slides, you will notice, those of you in the audience that watch that most lit-up part of the map two slides ago, this happened on August 14, 2003, which we in the energy industry know very well. This is when New York blacked out and the Eastern seaboard blacked out. That is a date that none of us will ever forget. This ended up being the classic example of energy reliability failure . This not only had a tremendous impact on that particular region, but it has impacted the whole country in one way or another. For example, it brought down Wall Street. It brought down the stock exchange in any number of ways. While we're on here, I should say that, after all of the studies – international, Canadian and U.S. studies – took place and results came in, this ended up being a transmission problem that was identified.

Next slide. In addition to demands placed on electricity – and by demands, I mean there are reliability, affordable energy, environmentally selective demands placed on electric service – the construction of the delivery system, the power line grid, have not kept up with today's demand for electricity. On

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top of that, we have public policies nowadays, especially regarding renewable energy use, that basically use transmission in ways that [were] never envisioned, once it's built. So there is a lot of pressure on today's transmission system.

Next slide. This is probably not quite up to date, but it does give you an idea. Over half of the states in the United States have some type of renewable energy standard or goals in their state, and they are all different. But the point is that each one of these, especially the mandates, all dictate that a certain type of electricity generated from renewable energy must be delivered to the customers in that state. That places additional requirements on the delivery system that were never envisioned when the delivery system, the power grid, was built.

Next slide. In addition to that, renewable energy has to be built for the most part in remote places.. A lot of renewable energy must rely on the resources that are available. One of the most common, of course, is wind resources. I put this slide in just to give you an idea of where the vast wind resources will be, and other than the offshore [wind], which is just starting to be developed now, offshore and Great Lakes, the on-shore wind resources, as you can see, are in the middle of the country. But if you remember back to those earlier slides with the points of light, the greatest usage of electricity, the highest population density is on the Eastern sea board. This raises the question, a very basic and very large, wide-reaching question: is it feasible, logical, and desirable to build large transmission lines to deliver energy from the high wind resource part of the country to the highest population density part of the eastern sea board? Now, that is a question that EISPC and its counterpart in the industry, and policy makers are all – and I am sure that you all are – looking at, at this time.

Next slide. The Department of Energy is looking at this question, too. That is why it took some of the money that Congress had portioned to explorative studies and projects, and created the first-of-its-kind planning effort among all of the states of the union (or, the 48 states of the union) to look at and focus on transmission planning. This has never been done before on the large scale. Transmission planning has always been done on a state-wide basis or a

US EPA ARCHIVE DOCUMENT

regional basis but it has never been done on an interconnection-wide basis. So DOE provided money to each of the three interconnections to actually do this and set out a structure where the states could be involved in the planning as well as the industry participants. This is what the quote looks like if they quote directly from the Department of Energy.

Next slide. These are the three interconnections, just so you know. When we're talking about interconnection, the United States electrically is split into three parts. There is a voltage difference between the eastern and western interconnections. That is the way it was built when electricity was built back at the turn of the 20th century, in the very early 20th century. So when you hear interconnection in the United States, these are the three interconnections. There are plans right now, entrepreneurial plans right now [giving] a transmission line to each, connecting the three different sections of the country, but, right now, for the most part, this is why they are split into three. So we have the three different interconnection studies going on as we speak. And we are looking at the Eastern Interconnection in the country.

Next slide. The way the Eastern Interconnection study – transmission planning and resource study – process is structured, is the policy makers in the blue part, (EISPC), are made up of state representatives. We're not only talking about utility commissioners, but we have governor's offices' representatives, we have state energy officers, and we have environmental agencies. We have members of the legislatures.. Utility commissions have looked at this in the past and I am most familiar with it, but this is including other state energy-related governmental agencies and experts. So this is first of the kind (in the world). We are working very closely with the engineering team, which we call EIPC, which is made up of the planning authorities. They can be regional transmission organizations or transmission owners, the ones who provide the energy and provide the transmission.

They also hired consultants to run resource models – big computer models – and prepare transmission plans. They have also put together a Stakeholder Steering Committee. If you hear the term SSC – Stakeholder Steering Committee, that is that. They have representatives from major sectors interested in energy studies. We are talking about environmental groups,

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energy suppliers, energy transmission owners, energy end-users. There are a number of sectors who are represented on this SSC as well as EISPC who is also a member of the SSC. In addition to the SSC work – the input that the policy makers provide to the steering committee – EISPC itself is charged by the Department of Energy to conduct studies and prepare white papers.

Next slide please. I guess I have pretty much gone through this slide. So we can go on to the next slide.

The Futures are listed here, and we will note that almost all of these Futures – or actually all of these futures, the eight that we have listed here – have components, or actually are focused on, environmental policies or environmental issues or aspects, including the EPA rule-making that is happening right now. Each of these eight Futures will also have nine sensitivities per future. And what I mean by "sensitivity" is that they will run a computer model based on a selective variable or each of these Futures, and then they will change one of the variables and rerun the model to see what impact that one variable has. That is a sensitivity. So we will actually have eight Future runs and 72 sensitivity runs. So we are going to have a lot of computer modeling information to show us the different impacts on how we take different policies, different costs, or any number of different things would impact potential Futures.

Next slide. These are the list of the studies that EISPC is charged to do, beyond the Futures and the sensitivities, and the transmission studies that will come out of all of the Futures and studies. … Of the futures and sensitivities, EISPC and the SSC will choose three examples or three Futures upon which the planners will run full-fledged transmission build-out studies. So there is going to be lines on that transmission [map] to connect the generation to the load population centers that need the energy.

Back to the studies, these are the studies that EISPC has chosen to work at. Energy zones being the first of them and probably will be the biggest. And the rest of these, you can see almost all have aspects of environmental issues and challenges.

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Next slide. As well as studies, EISPC has also charged with doing a number of white papers. This will be more along the lines of looking of at data sources and information sources and pulling together different sources of information into white papers. A number of those, again, you can see that they are focused on different environmental or clean energy aspects, and impacts of various types of technology.

Next slide. This is the very [rough] timeline of EISPC tasks. We, in the next month to two months, or by the end of March, will be completing all of the resource modeling inputs – the Futures, the sensitivities, as well as all of the data and assumptions needed. They will need to start running their models and working in conjunction with the planners and the sectors on this Stakeholder Steering Committee. Immediately after that work is finished, we will switch gears and start on the energy zones project as well as the other studies and whitepapers. We already teed that up last week, at the last EISPC meeting. We will be talking more about it in February and we'll get it going in action in March. We will be working on that throughout the rest of 2011 into 2012. Later in 2011, we anticipate that the modelers will provide results of all of their Futures and sensitivities modeling runs.

We will be able to take all that information and analyze it and start formulating which or what three transmission build-outs we would like to see, based upon those Futures and sensitivities. And again, EISPC will be working closely with SSC and the planning authorities and EIPC to come about those three transmission build-outs. The transmission engineers will take those three choices and go back and start putting together the build-out studies. EISPC in the meantime will continue with energy zones and other studies and whitepapers into probably about end of 2012. We expect to get the transmission [build-outs] towards the end of 2012. We expect to see the results of the transmission build out from the planning authorities, the modelers, and the transmission engineers, and we'll receive those and complete the work on the energy zones and studies and whitepapers at the end of 2012 into 2013. The grand cycle runs out for EISPC in 2013.

And I believe that is the end of my slides, if anyone has questions.

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Catherine Morris: And we do have a few questions for you, Marya.

Marya White: OK.

Catherine Morris: One question is, what are the roles of the five eastern Canadian provinces in this study? Are they being included as part of the modeling effort?

Marya White: Oh, that is a great question. I'm glad you asked. They are absolutely included, Ontario, Quebec, Manitoba, New Brunswick, and I think I missed one. I'm sorry. Anyway, Canada is right in there. Canada is a sector on the SSC and Canada is also part of EISPC and we have Canadian transmission that is included in our studies and sensitivities. The modelers are modeling transmission in Canada and how it impacts the United States. So thanks for asking the question, because I forget to say that.

Catherine Morris: Another question asks if you could explain a little bit more about the study that you are going to undertake on the energy zones? How do you define energy zones for the purpose of this study and can you say a little more about it?

Marya White: Sure. I am speaking a little prematurely here simply because the council has not had the chance to really lay in on this, but so far the council has decided, has voted, that it will not only be the renewable energy zone that we will look at, but it is the clean energy zone that we will look at. In other words, it will be renewable energy, the model of renewable energy with PV solar and wind, etc., but it will also includenon-renewable generation. It will consider clean coal with carbon sequestration. It will consider off-shore wind, of course, and any other energy storage technologies, anything that could help further – for example, what the president's state of the union address was talking about. The council specifically made that decision, which will be on renewable to other forms of clean energy, because of parts of the county – and I'm thinking particularly of the Southeast, which does not perhaps have wind resources like the middle of the country does but they do have potential resources for biomass and solar. The Southeastern part of the country is also very interested in nuclear development.

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As far as definition is concerned, that is fairly close definition for what kinds of energy are going to be looked at in energy zones. As far as how detailed energy zones are at this point, I would say that they are going to be fairly amorphous and high-level planning tool simply because in the Western Interconnect, for example, they started their energy zone project a couple of years before this Department of Energy project came on, so that is two to three to four years, to my understanding, to get it detailed now and they are only now looking at including it in planning. I don't think there is going to be time in this grand cycle to accomplish all of that. We are not sure at this point but the states will be on that. I think they are looking more for a study that is going to just inform them as states and the regions look at projects before them. So I am hoping that helps answer the question.

Catherine Morris: Yes. I think you did and you do have a couple of more pretty tough questions but I think after Brian's presentation maybe the two of you can come together and answer some of these about the conflict between this study and state policies and how those differences might be resolved. But let's first introduce Brian and come back to that.

Marya White: Sure.

Catherine Morris: Brian is our second speaker. Brian Rybarik is the executive assistant to Commissioner Lauren Azar in Wisconsin and has been her assistant since 2008. Commissioner Azar is the president of EISPC. So as you can tell, a lot of his work has been focused now on this new effort. In addition to that, he has served as one of Wisconsin's representative to EISPC. Each of the states, as Marya pointed out, has several representatives on the EISPC committees. So we asked Brian to talk about the specific question of what is the interest of the state in participating in this project, and what they hope to get out of it. So, Brian, your slides are up and I will now hand it over to you.

Brian Rybarik: Sure. Thank you. I am going to start with an apology. The best laid plans often go awry. I had planned on traveling today, and planned to be in a quiet place for this, and that did not work out. So I am in kind of a loud and echo[-filled] place so if people have trouble hearing me, let me know and I'll try and make it work around, but sorry for the background noise.

US EPA ARCHIVE DOCUMENT

Just to start off, as Catherine mentioned, my position is with Commissioner Azar at the Public Service Commission of Wisconsin. She is the first president of EISPC, the entity that Marya just described very, very well. And I do want to point out that when this started in its humble beginnings, a lot of the confusion right now is because we have nearly the same acronym as the Eastern Interconnection Planning Collaborative. We have discussed, perhaps over a couple of drinks, the different acronyms that we could come up with – and I can't remember [what it] actually stood for now, but the states had actually thought about coming up with EIEIO as our moniker, and, I think hopefully, maybe wisely, chose to go a different route, but of course [there remains] a lot of confusion now.

Before moving on into the sensitive part, I also did want to take an opportunity just to recognize there are a lot of people working on all the stuff that Marya just mentioned. It requires a lot of people hours, and besides Marya and the folks at EISPC, and all the state representatives that I am going to sort of focused on in my area here, you know that the Keystone folks are also working on this project, right from the planning authorities, the PAs. There are a lot of people behind the scene with, the SSC sectors, and other areas, that are doing a lot of work on this in addition to their daily jobs, and I think that is a recognition of how important this can be and what an opportunity we have. So I wanted to recognize all those folks. … There are a lot of people working on this.

Moving on to the next slide, kind of why am I here, without getting too philosophical about that point. I want to just sort of describe the Wisconsin experience, and I want to make very clear in a disclaimer that I am really only speaking for the Wisconsin experience. Obviously, I am one of the representatives for Wisconsin, and I think this applies to a lot of other states but I want to make very clear that I am not speaking necessarily generically for what the state perspective might be. Just kind of looking at Wisconsin's motivation for participation and what we hope to get out of it. And on that note, I do also want to put out that while I work for Commissioner Azar, she is the other representative from Wisconsin. We are the two reps from Wisconsin. You might think that we agree on everything but anybody who

US EPA ARCHIVE DOCUMENT

has been following the EISPC process probably has noticed that we often disagree on some of that stuff. So not everything I say necessarily would be the sole Wisconsin perspective. It is my perspective.

As Marya identified, just as a quick overview, this is a first-in-its-kind exercise, and so Wisconsin's motivation for participation is, obviously, perhaps a little obvious, but we will get into some more specifics and then I am going to go in to some of what the key drivers are. And I think there are two main areas I want to focus on. Let me get to that point and that is that there are process benefits and data benefits to this. So moving on, to give you a little idea, I think I need to give some context for Wisconsin's participation in this and EISPC and we need to give a little historical perspective to get there.

This slide depicts the Midwest ISO. I took a screen shot of their LMP map a few days ago. This is from the 24th of January. And so Wisconsin, as a participant to the Midwest ISO, all of our utilities and indeed our cooperatives now are in the Midwest ISO, we followed their planning process very closely. And now they have done a lot under Order 890 for reliability planning, but the Midwest ISO has also included public policy efforts in their planning efforts, since the ERP has requirements, and, in fact, there is a new planning effort in the Midwest ISO now addressing the EPA regulation. So I don't want to say that Midwest ISO is more progressive than any other planning authorities. It is the one we have familiarity with and they have been very attentive to the needs of state entities. Perhaps one of the reasons they have been very attentive to those needs is we have a very strong state organization called the Organization of MISO States, and you know that they are very powerful entity in the energy world because OMS is the Organization of MISO States, and it has an acronym embedded in its name so you know we're serious.

But in 2009 when Commissioner Azar was the president of the OMS we engaged in what's called the Cost Allocation and Regional Planning efforts – and you can see that if you take an acronym of that, it is the CARP planning effort, and I hope the EPA representatives on this are attentive to the fact that I have used a common carp as the picture in this, and not the much feared and politically charged Asian carp. But the CARP process – this is a little weird

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being here because I don't get a feedback. I am sure everybody is sitting in their office laughing hysterically right now with that great joke – but the CARP process was a partnership and really big undertaking for state regulators in the Midwest. Remember, we're just talking about its region, the Midwest ISO region – a great undertaking of what futures they wanted to see modeled, and what they wanted to see used in that. So there were a lot of meetings under the CARP process where regulators sat at a table and looked through gas prices, looked at construction cost, and looked at the futures they wanted to see modeled. So a lot of that effort was also focused on cost allocation, but I will not focus on that right now. So what did force the Midwest ISO regulators to view? It really forced everybody to recognize the interdependence that we have, and look at the region to recognize that potential changes in the generation portfolio are going to make dramatic changes in the transmission strategy.

So we look at things like RPS requirements, carbon and emission limitations, and other policy initiatives, and further focus on the economies of scale. It may seem intuitive that this is going to have significant impact on transmission, but it forced regulators to buy in to a planning process. And then, also, what resulted from that was a map of transmission lines. Maybe a picture is worth a thousand words, but what I think it made everybody realize that was involved in that process, is that those pictures are in fact worth a thousand assumptions, and they had to sort of get their hands dirty on how this planning process moves forward. So that was obviously a great benefit of the CARP process. Now, why does Wisconsin want to engage in a more regional focus? I pulled this slide up from a recent strategic energy assessment that Wisconsin engaged and here you'll see our own resources based on energy and where those resources come from. So you can see, we're very reliant between old coal and new coal of our coal resources. So if dramatic policy changes are coming, you can see that Wisconsin is going to have probably a pretty dramatic reaction to that.

The next slide is the same concept but looking at nameplate capacity. When you look at coal and other fossil fuels, including gas, you can see it is a really, really big chunk of our generation. So as Wisconsin is engaged in the CARP process at the Midwest ISO, then along comes this bill on Capitol Hill called

US EPA ARCHIVE DOCUMENT

the ARRA, the American Reinvestment and Recovery Act, and it includes the funding for transmission planning and all of the interconnections – and I am going to use Marya's slide. Actually, before I go there, I look at these few slides of just what our energy and capacity are by resource. When Marya was giving her presentation, she showed a map of wind resources in the U.S. as well, and when you look at that – I don't have it up here, but when you looked at that – Wisconsin doesn't have a whole lot of great wind resources.

If you look into the Great Lakes, they get a little bit better, but Wisconsin is also looking at the same – if we're going to have a really strong RPS or a national RPS, we really need to start thinking about what our options are. So the ARRA comes along. And, then, this is a reproduction of a slide that Marya has. This is what we're looking at in CARP and now all of a sudden the picture gets quite a bit bigger. I will also point out that while I am replicating this from Marya's, it was an opportunity for me to figure out how to incorporate a presentation of that. I think that is successfully done here. If anybody needs to know how to make one of those in PowerPoint, I'm pretty much an expert now.

So what has this forced us to do? Looking at it from a larger region, it once again forced us to recognize interdependence. And I think Marya's slides on the 2003 blackout are really informative. It is a really great [example] and a really great memory that everybody has of how important it is that we recognized how interconnected we are. As we move forward or as this process has moved forward, we have also identified new issue that we need to solve – EPA rules are more forthcoming. We're learning more about those daily, and, in fact, I believe Paul is going to walk us through some more of those and give us some more details on those in just a minute here, and also the new clean energy that Marya mentioned in her presentation. And of course this is something that EISPC discussed with me just last week – do we want to modify our futures in order to capture the clean energy standard the president was talking about, as that moves forward? And that is going to be a discussion at the SSC next week. So, a lot of moving parts, and I think a lot of flexibility on everybody's part to make sure that we get modeling that is going to make a real difference, not only for the planning authorities but also for the states.

US EPA ARCHIVE DOCUMENT

So I also want to make one note here – really that Wisconsin isn't participating in this process before we get into some of the specifics because we think there is going to be some plan that comes out of this that is just perfect and we can use that as, "All right. Well, this is what the Eastern Interconnection Planning Collaborative says we need to do so let's go with that." In fact, any plan that comes out of it is going to be nonbinding on the participants and that is something worth repeating a lot. But it is going to provide benefits and ideas of how we can move in the right direction. If we look at a number of different Futures and we're seeing certain transmission facilities identified in a variety of those futures, or certain generation facilities identified in a variety of those futures, that gives us a lot of information at the state level that we can move forward with, as these Futures become more clear.

So what are the benefits? I want to start off with the process benefits. The fact of the matter is you have 81 state representatives, Canadian representatives as Marya pointed out, and when you get to the SSC level, you have a variety of different stakeholders from across the Eastern Interconnection that they may not normally interact with one another, and it is just really interesting to hear the perspective of other state representatives. It is interesting to hear how other people interact. … I put in parenthesis here "people matter" and, you know, I can say for myself that I've already met a number of people on this process that have become very important and trustworthy contacts for me. And I am sure that you have a lot of other people in this process – and to sort of take a step backward from that, let's all realize right now, this is some really dorky stuff we're talking about here. And when you can find people who are as engaged and interested in this as you are, it is really great to know that people out there have the same passion for this stuff, and I think that has been one of the great benefits for me and hopefully for others as well.

Another benefit from the process – and this is inclusive of what I just said – is understanding the resources and constraints in other parts of the country. And I don't use "constraints" there from the transmission perspective – I mean that from a policy perspective, perhaps a political perspective. I will give you some examples of that, maybe a little bit later, but the one example I did want to highlight here is the baseline infrastructure example, and to put some context into that. The baseline infrastructure, the term we use and I think is

US EPA ARCHIVE DOCUMENT

being used pretty much all around on the EIPC side, the SSC side, and the EISPC side, is the transmission infrastructure and generation infrastructure, that will be used as part of model when it runs the Futures. And I want to make very clear that there are structures or facilities that will be used in the model that don't exist today, and so we had to make a determination. When we look at all the planning processes in the Eastern Interconnection, some of the planning authorities said, "Well, these facilities are going to be in by a certain date and so we should include them in this planning process, in this modeling process." EISPC, the state representatives want to step back and include in the baseline infrastructure only those facilities that we thought were reasonably certain, and not just anything that had shown up in a regional planning effort.

So we went through, we identified some generic threshold and identified facilities that we thought should be eliminated. And then states were able to bring challenges to either exclude or include facilities. And we had a very long webinar, sort of interactive webinar, where people could see which challenge was up, the state of challenge, to get to speak to a SSC member you got to sort of speak to as well, and then the states collectively decided which facility should go in and which should not go in. So through that process, it is just one of the examples where we learned a lot of our fellow Eastern Interconnection states. We learned a lot about what is in the different planning authorities plans, and I think identified some areas – or, planning authorities identified some areas – where they might be able to be better in the future and states work together a little bit better.

So another benefit of the process of course is that it helps us identify any regional quirks and help ensure that those are captured in the model. Without naming any modeling efforts that have happened in the past, regional differences have proven to be a major problem when a map comes up that shows a lot of transmission going from one place to another place and [people have] been very deliberate in this process in trying to avoid a similar outcome here, and they have devoted a lot of resources to this, and I think they want to make sure that there is buy-in in the process along the way. And so the fact that each state has two representatives, one designated from the state

US EPA ARCHIVE DOCUMENT

commission, and then, like me, I was designated through our governor's office.

Given that the whole viewpoint and perspective that everybody has, we should be able to identify the regional issues that we might have in Wisconsin or somewhere else in the Eastern Interconnection and try to make sure that there are no modeling biases that come out of this. So while it is likely that the product of this – as I said before, any maps that come out of this or any transmission plan that comes out of this is going to be wrong and we're going to inevitably make some assumptions that don't turn out to be true. The benefit of having all of these [stakeholders go] through this together ensures that we have an opportunity to identify major issues along the way.

And so the other side of this, that I think is very important to note, is that, of course, we're going to be giving a lot of information. As Marya pointed out in her presentation, there is going to be a lot of data collected between the Futures and the sensitivities, and so this will help us identify what my generation portfolio looks like under different futures, what cost might we have. Marya went through a lot of this and I am not going to focus too much on this. From the data perspective – and this is sort of the middle of the diagram, where the processing data come together – you know, if I am a state participant in this process, I can sort of help decide what data is developed and we need to identify state regional issues that are important.

And I just wanted to run through a few handful of issues that I think really underscore the state perspective on this and where states really get a lot of benefit from this process.

Again, I can only really speak for Wisconsin but these are observations I have had in this process, nuclear issues being the first example I have listed here. Representatives from the Southeast have been very vocal throughout this process of how important nuclear energy is and likely it is going to be in their futures, and they have identified this throughout this process of how important it will be. EISPC eventually designated a "nuclear resurgence" Future as one of the Futures, and the SSC has agreed. So as you can see, being a state

US EPA ARCHIVE DOCUMENT

participant from the Southeast has really driven some of the data that is going to come out of this.

The next example is the "environmental regulatory curtailment." And this is an issue raised by a number of states including (inaudible) and is the idea that we're modeling a number of environmental futures that has changed dramatically environmental policy moving forward, And some of us wanted to see [those] models, but what happens if we were to go the other direction on some these environmental policies? And so we're going to have some sensitivities to try and capture that. And then the final example is off-shore wind. A lot of Northeast states have been very vocal about the need to have this in the modeling, and they work to ensure that [offshore wind projects] are included in the baseline infrastructure. So that is where states can kind of move the ball on this and make sure that their issues are identified.

That is the overview I have. I have one more slide for everybody just to make sure that there were two (rules) this weekend and that the Green Bay Packers will of course prevail and well at least to help some way. So everybody on the webinar is encouraged to cheer for the Packers this coming weekend. So with that, I will go to any questions.

Catherine Morris: Yes. The first thing I want to do is to assure you that your jokes did not fall on deaf ears. We have had several people sending in comments such as "Haha." And there were some – you did touch on a couple of the other issues that people are interested in hearing about. Certainly, you're in the middle of trying to balance a lot of the political interest and the policy interest of states across the region who, as you pointed out, have very different focuses on what they wanted to see the future look like. So one of the question that came in – a couple of questions, are asking how will conflicts between, say, the analytical results that are coming out of the modeling or EISPC studiesand existing state policies or political interest be resolved? And another related question, which is, do you think that the result of this project will be used to revise state energy plans? I wonder if you could address both of those.

Brian Rybarik: As to the first one, how would the conflicts be resolved? You know, that is really tough question. I don't know. I think the idea is to try and minimize

US EPA ARCHIVE DOCUMENT

the number of conflicts that are out there by ensuring that the state perspective is reviewed and considered every step along the way. Now, inevitably, there are going to be some issues that arise at the end but I think this is one where we're hoping it is not an issue of process. It is an issue of politics and that is going to probably have to be resolved in some other context other than a planning process like this one. Now, to try and help resolve those issues throughout this process, the EISPC bylaws require that for any position of EISPC we actually has to have a supermajority of the states agreed to that position.

And in fact, we have two methods of voting. It has to meet the supermajority under two methods – and one is a senate method, where each state gets two votes, and then one is a house method where we took the total load through sales. We used (inaudible) to do this and states that have higher load actually have higher-weighted votes in the house voting method and states with lower loads have lower-weighted voting. And to just touch on a point really quickly, we do include the Canadian provinces in our process, however, they are ex-officio members. They do not technically get to vote in the process but we certainly try and open the door and encourage them to participate along the way. So I think the goal is to try and minimize those political concerns but inevitably, we are going to have issues with that and I think we will have to see where those come out at the end. But the goal here is in the planning process to try and minimize those.

Catherine, you have to repeat the second part of the question for me really quickly because I have already forgotten.

Catherine Morris: The question was whether or not you felt that the outcome vote of this project have any influence on the state energy plans?

Brian Rybarik: You know, I don't know the answer to that. I think it will at some degree. It is certainly going to provide a lot of information for the state to look at and a lot of interesting at least potentially interesting outcome. Can I guarantee 100 percent that one will be incorporated in the state energy plans? Probably not but if I were a betting man I definitely put money that the data that comes out of this is going to see its way into those somewhere.

US EPA ARCHIVE DOCUMENT

Catherine Morris: Yes. I think it is worth knowing that in addition to this being a transmission planning exercise, a lot of the information that is going to come out of it is going to be related to what the generation system might look like under these various futures. So there will be a lot of information about where generation might be located under certain different assumptions and that certainly may inform the state energy planning process.

Brian Rybarik: That is a good point.

Catherine Morris: I sort of jumped in there. You did note that Keystone has been working with the stakeholder process of this.We started in very early stages trying to help develop the steering committee – the Stakeholder Steering Committee – and I have facilitated the Stakeholder Steering Committees each time they meet which is about every other month. So if you have any questions regarding that aspect of the process, we would be happy to answer those.

There is one last question for you which is who are those Packers?

Brian Rybarik: One of the greatest sports franchises in the history of all professional sports, but I don't want to overstate it too much.

Catherine Morris: Let me introduce the final speaker, Paul Peterson. I want to make sure we have time for questions that may come up regarding the study that he has. He is the co-author and he is going to give you a little more background on it. It is called Public Policy Impacts on Transmission Planning and should also be up there with the background documents on the website. Paul has been with Synapse Energy Economics, which is a consulting firm located in New England, since 2001, but he has also been involved with energy efficiency policy issues through his work at the University of Vermont Extension Service, the Vermont Public Service Board, the ISO New England which is an RTO, and he focuses on, in addition to energy efficiency issues, a lot of the RTO wholesale power market issues and system planning. So we asked him if he would give you some background about the study that they did, which really links public policy and transition planning and particularly the environmental aspects of that. So Paul, I see your first slidet is up.

US EPA ARCHIVE DOCUMENT

Paul Peterson: Great. Thank you, Catherine. I have 12 slides. It is really going to give just an overview of the report that we did and I would encourage people who are interested in this to actually download the report and look through it, and I would be happy to answer questions at the end of this presentation or anytime in the future. You have my e-mail address and people could send me questions.

We go to slide two. The way we kind of designed our report was we were asked by Earth Justice, our client, to look at the Federal Energy Regulatory Commission notice of proposed rulemaking. That is FERC NOPR called RM10-23. In several places in that document, but particularly the paragraph 65 which is quoted here, the commission indicated that they would like to have planning authorities, transmission providers, identify public policy requirements that are appropriate to include in local and regional transmission policies.

Go to the next slide. So our team (inaudible) was that planning authorities, the transmission providers, are under an obligation under Order 890 to make a reliable and efficient bulk power system and we immediately thought of a few state federal policies and goals that might be worth looking at, and we decided to focus on two of them, the energy efficiency program that a lot of states have initiated and EPA regulations that will likely impact fossil fuel fire resources and possibly lead to retirements.

Go to the next slide. So the first issue that we looked at, energy efficiency, we looked at how the state policies and energy efficiency might impact load forecast, and these are key elements in any transmission planning process. First is to try to determine what load will need to be met during the peak hours of the year – and load forecast, in a large sense, has been moving towards the use of a econometric models, although not all planning authorities currently use the econometric models. So the planning authorities used different starting points, different approaches, sometimes starting with a load forecast. Some of the planning authorities explicitly include what are called energy intensity factors. Energy intensity is simply explained as a measure of the efficiency with which we produce things whether we are talking about building cars or light bulbs or your generic widget. How much energy goes

US EPA ARCHIVE DOCUMENT

into the production of that particular item? It includes things like how do we efficiently heat and cool our buildings. Energy intensity has been improving at a steadily increasing rate in the United States, meaning we produced more and more goods with a little bit less energy input in each of those goods, but we are still quite a way behind one of the other industrialized countries in Europe and Japan.

A very important element in trying to determine the load forecast is understanding how codes and standards may affect the use of energy – electricity energy. And the long term codes and standards may become the mechanism to replace the current energy efficiency programs, but under today's processes, we have some codes and standards in place, discussion of a lot of other codes and standards that might be appropriate to add, and we have demand-side management programs that are going out and trying to acquire energy efficiency resources. A fourth area to look at are state/federal policies and goals, and the fifth area are the forward capacity markets – which, the forward capacity markets require advanced commitment by resources three years in advance. They, in a sense, provide a three-year notice requirement if a resource isn't going to be available. All of these elements are important to consider when you're trying to come up with a good load forecast.

Go to the next slide. This is a graph showing New England, for weather normalized Net Energy for Load. This is an energy slide. And you can see since 1980 that there is an uneven trend to the way energy is consumed over time. I think the two most important factors to look at, that stand out of this, is in 1990 New England had a considerable recession and there has been a significant recession across the country in 2007 and 2008. You see at the very end of the chart, this data goes through 2009. We have data on 2010. It is not on the chart but it is a slight uptick of just above 130,000 GWh level. So even with the recovery starting, there is no dramatic increase in the need for energy.

Catherine Morris: Paul, are you still with us?

Paul Peterson: I'm still here. I'm sorry about that phone in the background but I can't get it off.

US EPA ARCHIVE DOCUMENT

We go to the next line. Looking at this trend for the last 30 years, we decided to take ten-year segments and just do a simple average of energy growth on those ten-year segments. This is a very crude analysis. This is not a sophisticated analysis. It is just a simple ten-year average. But I think it provides, you can see by the slope of the red lines, you can see how the change in slope has been occurring over the last three decades, and we also supplied the average number per year. The first 10-year segment is 3429 GWh increase per year. The next segment is a little over 1200 GWh which is almost a 2/3 reduction. In the last ten years, you've seen another 50 percent reduction down to an annual growth rate of 63 GWh. Establishing these trend lines is usually the first thing that happens in a planning process, to try to identify what happens in the future.

If we go to the next slide, this is the analysis we did in the Earth Justice report. We did this for three different RTOs – for New England, for MISO, and for PJM. This slide is of the New England peak loads and we're shifting from energy which is the last slide. These are peak loads and it shows a forecast with four different variations and the first top line, the solid blue line, is the total peak demand with no reduction for energy efficiency programs. And in New England, we have energy efficiency resources that have been in the four capacity options. So we have actual megawatt values, and those values had been subtracted to create the second line, and if those values changed up to 2013, then they stay constant because that is how ISO in New England currently forecast peak load. We then added the middle line which is an analysis that shows an average of about one percent per year annual energy reduction and you can notice that this increase is very slowly increasing peak load through 2030. And then next two lines show higher penetration assumptions for energy efficiency. The triangular line is 1.4 percent annual reduction in energy and the fifth line is a two percent annual energy reduction due to energy efficiency.

We go to the next slide. Each of those five cases is described in a little more details. Just a highlight, the first one is no EE reduction. The second is current ISO-New England planning process. The third is a modification to the ISO process which uses an average running out through 2030 of about one percent. And the next two use larger percentages. If you go back to the

US EPA ARCHIVE DOCUMENT

previous slide, the importance of doing this type of analysis is to develop a range of possible future loads and I would suggest that the most likely future load based on our analysis is something along that middle line. While looking at what even more intensive investments and energy efficiency could produce it, states we're committed to making those investments over a long-term basis. The rates in New England today are between the one percent and 1.4 percent with a couple of states actually having achieved a two percent annual reduction. Now, the thing that is uncertain is whether those types of reduction can be sustained over a 10, 15, 20-year period. And that is why for our purposes we used several different ranges to show the different possible outcomes.

We go to the next slide. No, two slides forward actually. The second part of our report looks the process EPA has engaged into revised rules and we look at four different rules. First is the Clean Air Transport rule and that basically looks at [emissions] limits, how it might impact states that are down wind and imposes more restrictions on those emissions. The Air Toxics Standard is creating emission limits for over 180 different pollutants. The Coal Combustion Residuals Rule review is looking at fly ash, bottom ash, boiler slag, and flue gas materials. And the Clean Water Act's relevant part of the EPA review on the electric industry is water for cooling and this will mostly impact steam generators. So EPA is looking at four separate rules, or series of rules, for getting to four separate topics, and the dates we are showing are the currently anticipated dates when the draft rules will be promulgated and then there is a review process and a comment period, and there is some uncertainty in the long term as to exactly when these will be implemented but these are the tentative schedule EPA has identified.

Go to the next slide. In our report, we reviewed a number of different analyses, the industry analysis that looked at the possible impacts of these rule changes on generation units in the United States. You have the American Electric Reliability Commission, Credit Suisse , ICF, MJ Bradley, Bernstein, and Exelon. Each of these different analyses made certain different assumptions about the EPA rules. Some of them only looked at one or two of the rules. Some of them looked at all four of the rules. They estimated what

US EPA ARCHIVE DOCUMENT

they thought were likely retirements based on size, age, and current control equipment of existing generation.

The analysis looked at the fact that new control technology may not be economic for coal plants and they generally agreed approximately 300 MW or smaller but there are many exceptions to that general statement. So plants that are smaller than 300 MW may not be in jeopardy of retiring and plants that are larger than 300 MW may be in jeopardy of retiring but in general, they believe the summary of these analyses, and our review is most of the impact will be on the relatively smaller or possibly 300 MW generation facilities. The estimate cluster around 40 GW to 60 GW of retirements, which is a significant quantity of retirement, in some estimates go as high as 80 GW or more. And as I mentioned earlier, the effective dates of the rules and the compliance timeframes for complying with these rules are still uncertain.

We go to the next slide. What we recommend in the Earth Justice Report is the transmission planning authority should begin screening resources that might be at risk, and resources that are at risk could be at risk for a variety of different reasons. It could be the licensing, the regulation issue. It could be at risk because of economics. They may not be profitable to run certain generation resources in the future. They may become at risk due to technology changes in order to meet some of new EPA requirement. They just may not be able to adapt a particular facility to retrofit technology to meet the new rules. There may be some fuel supply issues. We had an experience in New England several years with limitations on natural gas supplies to pipelines in cold winter months and that lead to an assessment by us on New England, on some different operating procedures for running natural gas plants on with the cold winter periods.

The other thing that transmission planning authorities do, and where this generation issue becomes very relevant, is whether overall resource adequacy analysis for bulk power system. This is, I believe most people are familiar with the one day in ten [years] loss-of-load probability analysis, and that is supposed to design the bulk power system so that a loss of load is experienced no more frequently than one day in ten years. That is an overall requirement for the entire system. Transmission planners also do reliability analysis for

US EPA ARCHIVE DOCUMENT

components of the bulk power system. And those components include things like voltage stability, short circuits. It is not just is there adequate resources but to the combination of resources and the location of resources maintained meet proper reliability standards. The third place for this becomes important is what I call operational analysis for forecasting. Planning authorities often do day-ahead commitment processes for energy and reserves also real-time commitment processes, and they do what it's called posturing of units. All of these processes would benefit from a better understanding of what resources are at in the long term and what resources are not.

Then the final slide just summarizes what I called key issues. To have a good and effective transition planning process of figuring out the best estimates of future loads and future energy intensity factors, analyze the impact of aggressive energy efficiency programs as Brian and Marya have already mentioned, the renewable portfolio standards and a lot of states are very important, resource retirements for those fossil plants, nuclear plants, or other plants, what new resources and technologies are likely to come in. It approves things like RPS or two direct subsidies of particular technologies and what are states' and possibly federal carbon policies that might be in place in the future as well.

I will turn it over to questioning, with the final comments that nothing in this presentation or in the Earth Justice report really establishes any firm conclusions about the bulk power system. We at Synapse are just kind of just scratching the surface on these types of analysis. We need more analysis and better reports and the planning authorities are probably best situated to be the ones doing this job, in terms of doing these kinds of analyses and investigation.

So I'll leave it there and open up for questions. I thank EPA and Catherine Morris for giving me the opportunity today.

Catherine Morris: Well Paul, we have one question for you that may require a little bit of your explanation. If the econometric models which you reviewed in your studies can take into account macroeconomic trends like downturns and the economy

US EPA ARCHIVE DOCUMENT

and, if so does the model or modelers have an opportunity to make mid-course corrections in the planning and the actions taken?

Paul Peterson: Just to clarify, we did not use any econometric models in our analysis. These are what I believe most of the planning authorities use. They utilize various services. I am not certain that those econometric models include assumptions about economic downturns. I believe most of them react to [factor in] economic downturns and then make adjustments on a forward looking basis into future forecast, but I am not aware of any that explicitly include anticipated economic downturns into the future.

Catherine Morris: OK. I just got a pretty lengthy question. Let me take a minute just to read through it. The classic resource adequacy analysis takes the daily, weekly, and seasonal demand curve as more like a given and then assesses the minute-to-minute adequacy resources to meet that load curve. Demand response is included, when it is, only as a resource for peak shaving, to what extent has the analysis introduced more dynamic demand response, as like within-day balancing as a resource and makes the demand curve more responsive on an hour-to-hour basis?

Paul Peterson: That is an excellent question. A lot of people are wondering how that analysis is going to be done. Just to summarize, I think what the person is asking is if demand response is looked at as resources available on an hourly basis and is bidding into energy market, how would we know on a day-ahead basis what the demand is going to be in any particular hour? And that is really the question that I think a lot of planning authorities will have to struggle with. Again, the Federal Energy Regulatory Commission has an NOPR on demand response compensation that all the comments on that have been in for a month or two, and so maybe in the next two or three or four months we may see something from the commission that will resolve some of the issues about compensation and participation of demand resources in energy markets, and then we will be able to see greater participation from those resources and (inaudible) what those impacts are. But trying to model those impacts for a planning authority of how demand response will participate in future years is a very complex and difficult thing to do, but it is a challenge and I think they are willing to take if they are given the tools to do it.

US EPA ARCHIVE DOCUMENT

Catherine Morris: Right. I just noted that the EIPC modelers for the Eastern Interconnection Study have also been [faced with] with that same question, and how should we integrate demand response into our analysis. We have a couple of futures that specifically call for aggressive demand response and energy efficiency and distributed generation. So we've been working pretty closely with the modelers to figure out how that will be interpreted and I would just encourage those of you who are interested in that particular topic to stay tuned or maybe get on the list or the EIPC project which you can do on their website and follow how those results are both modeled and interpreted.

Let me go back to some questions that are really on the EIPC and EISPC project. One is whether or not tribes have been included as one of the stakeholders and I can just say that we had some early questions about whether some of the tribes, particularly in New England area and Canadian borders, were interested in participating. We don't have anyone on our stakeholder steering committee that represents tribal interests. So right now I guess the answer to that is no. I know in the West you might want to look at how, particularly, the questions about development of resources on tribal land is being handled because it is much bigger issue out there, and as Marya pointed out, that the same parallel process is happening in the West and in Texas, and some of those issues might be taken up there.

Another question, Paul, was how could folks get a copy of your study?

Paul Paterson: I believe you have it available at the materials for this webinar. Is that right Catherine?

Catherine Morris: I do and it is also on the website www.epatechforum.org but it is also on your website.

Paul Peterson: It is also on the Synapse website as well. Yes.

Catherine Morris: Yes. OK.

I think that is about all the questions we have coming in. We have, again, people asking if there is going to be recording of the webinar available after

US EPA ARCHIVE DOCUMENT

this and it is. We will have a recording and a transcript in at least a couple of weeks so you can go to the same website if you would like to review it or that you weren't able to stay on for the whole time.

Just a couple of comments that have come, but I think they have been answered for the most part, How storage might be taken into account in the EIPC project, how is pump storage being looked at from particularly the reliability perspective, and I know, Brian, you talked a little bit and I think Marya also mentioned that storage is going to be one of those elements that are considered in some of your studies. Do you want to expand on that at all?

Brian Rybarik: This is Brian. I'll take a stab at it first and just say, yes, that is something that we're focusing more on and I think a lot of the representatives – at least I have – gotten some contacts from different storage folks but the point would be the earlier [one] about demand response resources being able to be modeled in this type of exercise – I think the same issues apply here. You know, it is a difficult thing to model and I am not sure we have a very precise way of doing it. So we're looking to providers of energy storage in different modeling techniques to try and make sure we capture that, because I think, at least from a state perspective, if that is going to be one of the potential solutions to some of our issues, we had to make sure it is captured properly. So I think that is one of the things we have – from state perspective, we've got a lot of these instances where we've gotten to the point of, how do the modelers in this case, how do they model these resource or how do they model that? And I think we've had a lot of instances where we may be able to come up with a solution in this model that makes a lot of sense, but there are still a lot of questions out there and I think this is one of the open-ended ones.

Catherine Morris: Well, that is all the questions we have right now. I know we had a number of questions coming in a that were about the modeling results that might come out of the EIPC project, which, again, that is something that we won't know – what the results look like or how they might interpret certain things – for another couple of months, and, beyond just the modeling of these eight futures that Marya outlined, that would then go into decisions about how to model three really detailed scenarios. So if you're interested in following this, again, I would encourage you to go to the website eipconline.com and sign up for

US EPA ARCHIVE DOCUMENT

their listserv and you can really find out a lot more information about the modeling results itself.

Again, the background documents, the presentations, the recording will all be posted afterwards and I just wanted to thank – we had over 125 people on the call today so there is clearly a lot of interest in this.

Julia, did you want to again remind people about the next webinar?

Julia Miller: Sure. Thanks, Catherine. We're going to do a webinar probably the third week in February. We'll send a notice in the next week and we're going to do it on EPA's eGRID database.

Catherine Morris: Thank you to all the speakers.

Julia Miller: Yes. I would like to thank the speakers as well.

Brian Rybarik: Thank you.

Julia Miler: I really appreciate it and thanks to everyone for joining us, and hopefully you'll be able to join us for next month's webinar.

Catherine Morris: All right.

Paul Peterson: Thanks.

END

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