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POWERING AMERICA'S ECONOMY, SECURITY, AND OUR WAY OF LIFE: EXAMINING THE STATE OF GRID RELIABILITY

THURSDAY, SEPTEMBER 28, 2023

House of Representatives,

Subcommittee on Energy, Climate, and Grid Security,

Committee on Energy and Commerce,

Washington, D.C.

The Subcommittee met, pursuant to call, at 10:30 a.m., in Room 2322, Rayburn House Office Building, Hon. Jeff Duncan [Chairman of the Subcommittee] presiding.

Present: Representatives Duncan, Burgess, Latta, Guthrie, Griffith, Johnson, Bucshon, Walberg, Palmer, Curtis, Lesko, Pence, Weber, Balderson, Pfluger, Rodgers (ex

officio); Degette, Peters, Fletcher, Matsui, Tonko, Veasey, Kuster, Schrier, Castor, Sarbanes, Cardenas, and Pallone (ex officio).

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Staff present: Kate Arey, Digital Director; Sarah Burke, Minority Deputy Staff Director; Marjorie Connell, Director of Archives; Sydney Greene, Director of Operations; Nate Hodson, Staff Director; Tara Hupman, Chief Counsel; Sean Kelly, Press Secretary; Peter Kielty, General Counsel; Emily King, Member Services Director; Elise Krekorian, Professional Staff Member; Mary Martin, Chief Counsel; Brandon Mooney, Deputy Chief Counsel; Kaitlyn Peterson, Clerk; Karli Plucker, Director of Operations; Peter Spencer, Senior Professional Staff Member; Michael Taggart, Policy Director; Dray Thorne, Director of Information Technology; Waverly Gordon, Minority Deputy Staff Director and General Counsel; Kris Pittard, Minority Professional Staff Member; Kylea Rogers, Minority Policy Analyst; Medha Surampudy, Minority Professional Staff Member; and Tuley Wright, Minority Staff Director, Energy, Climate, and Grid Security.

*Mr. Duncan. The subcommittee on Energy, Climate, and Grid Security will now come to order. The chair will recognize himself for five minutes for an opening statement. I want to thank everyone for being here today, and welcome you to the Energy, Climate, Grid Security subcommittee hearing, powering America's economy, security, and our way of life.

Under my chairmanship on this committee, and under the chairmanship of our committee chairman, Ms. McMorris Rodgers, Republicans have focused on policies to improve the affordability and reliability of electricity for all Americans. We're conducting oversight of the Federal Energy Regulatory Commission, or FERC, the Department of Energy, and propose regulations, including EPA regulations and actions that impact the grid.

In June, we received testimony from the FERC chairman and the commissioners. A few weeks ago, we received testimony from FERC's director of Office for Reliability and the Department of Energy's assistant secretary for the Office of Electricity.

In each of these hearings, Republican members raised

concerns about the growing electrical reliability crisis and pressed the agencies on their actions to address it. Today, we're going to hear from the nation's electric grid operators who have the responsibility for dispatching power, balancing the electrical grid, and maintaining a reliable system.

I'd like to thank our witnesses for appearing before us today. The last time we held a hearing like this was in 2017. These grid operators are responsible for overseeing two thirds of the nation's power grid. The majority of Americans live in regions overseen by regional transmission organizations, or RTOs, and independent system operators, ISOs.

The nation is facing an electric reliability crisis, and the nation's grid operators are not equipped to address it alone. Federal tax subsidies and state policies designed to prop up renewables and the EPA regulations targeting coal and natural gas power plants continue to lead to premature retirement of the nation's most dependable generation sources.

As a direct result, grid operators have issued unprecedented warnings and pleas to conserve energy and

prepare for blackouts. That should never happen in America. Power outages can cause loss of life, extended outages have significant economic consequences. We continue to hear from FERC and the operators that we're facing a looming resource adequacy crisis.

At our June hearing this year, Commissioner Christie testified, "the increasing threat of system-wide extensive power outages is potentially catastrophic.'' Commissioner Danly echoed the concern, and noted the current wholesale market structure's distorting price signals jeopardizing reliability. The reliability experts at the North American Reliability Corporation, or NARC, have warned us repeatedly in recent years increasingly urgent terms about looming threats to reliability. NERC's CEO testified at the Senate this year that, "the United States is headed for a reliability crisis.''

In the same hearing, the CEO of PJM agreed there is a growing threat of crisis. There's a theme here. Crisis, crisis, crisis. We've heard repeatedly from other operators of the upcoming resource scarcity. This pending crisis is a result of several factors. Premature retirements of reliable

generation caused by renewable subsidies that drive massive supply of weather-dependent generation that undermines price signals for reliable generation in wholesale markets.

State renewable mandates and bans on the use of natural gas, the lack of pipeline capacity, especially in the northeast, and the new EPA regulations that will make it even more costly for power plants to operate. We all have a responsibility to respond to these warnings and act accordingly.

Turning the power off and demanding Americans conserve energy is not the answer. It wasn't the answer in the 1970s and it's not the answer today. In Congress, we should support policy efforts to bring more reliable generation online, period. Transmission connecting intermittent renewables is not a replacement for reliable generation. Unfortunately, the current market is pushing certain generation sources over others, picking winners and losers, which is making energy more expensive and less reliable.

There's no replacement for reliable energy. Every American should trust that when they flip the switch, the power comes on. Right now, that is not the reality, and we

need to have an honest conversation about what is wrong with the current system and who is ultimately responsible when the lights do go out.

The operators in front of us today face challenges in fulfilling their core mission of providing reliable energy to millions of Americans, and I look forward to their perspectives on the issues that they face and how Congress and federal agencies can act to support all Americans having reliable and affordable energy. I will now recognize Ranking Member DeGette for five minutes to give her opening statement.

*Ms. DeGette. Thank you, Mr. Chairman. Our nation's power grid is a massive and complex patchwork that powers our lives, and ensuring reliable electricity and operation of our power grid is paramount to our wellbeing and national security. These are the tenets of electricity that Americans expect and we all agree with this on this panel. Reliability, and affordability.

As I said in our energy efficiency hearing two weeks ago, when Americans flip a switch they expect it to come on, and they expect that it won't break the bank. Now, the

chairman gave a litany of issues faced by the power grid right now, but he left something out. I'm not surprised, and that is when you talk about the challenges of -- to the power grid, you're also talking about the mounting threat of climate change, because of the increasing severe weather situation.

So, Americans also expect that the energy that they rely on won't make this climate crisis even worse. As we move forward in the clean energy transition and we work to decarbonize every aspect of our lives, and as the impact of the climate crisis grows, reliability may literally be the difference between life and death.

Losing power during extreme heat or extreme cold events is life threatening, and so we must ensure that we have the assets and the infrastructure to ensure reliability, even as the climate changes. And that's why I really want to thank the panel for being here today. As the operators of the power grid for millions of Americans, every person here is responsible for keeping the lights on, keeping price down, and in a warming world, driving down emissions so we don't make this situation even worse.

Regional transmission organizations, or RTOs, and independent system operators, or ISOs, can help ensure that consumers have lower costs and in times of stress can tap into resources from a wide geographic area to keep the lights on.

RTOs and ISOs can also help take the patchwork system that's our grid and apply a comprehensive and regional approach to transmission planning that will drive down costs for everybody. Now, as we electrify more and more of our lives, we also have to bring more generating assets and transmission online, and we must ensure that the policies that provide business certainty and also foster clean energy are both in place.

To do this, we have to work together and I think that this hearing today will begin to foster that partnership. As we talk about reliability though, I do think there's one particular area that would make a significant impact, and that's increasing the number of transmission lines that we have in this country.

Building out transmission capacity will help more -- allow more generating assets to connect to the grid. It will

help for a greater ability to cross territories and help drive down costs for consumers as we work to connect more regions.

In times of emergency or natural disaster, it also helps us to get power to where it's needed most, preventing tragic circumstances from becoming catastrophic, and with increased electrification and anticipated increase in power demands, more transmission will be needed to bring Americans the electricity they need to power their lives. Irrespective of how that electricity is generated. So, I really do appreciate that the chairman is holding a hearing on the grid where we can talk about the importance of transmission.

It's really important that we conduct oversight of RTOs and ISOs, not only because reliability is important for our nation, but because I do think there are some opportunities for improvement within RTO and ISOs to help boost transmission deployment and in turn improve reliability. So, I would encourage the chairman to hold a legislative hearing on the transmission bills that we have introduced so far this Congress.

We have several colleagues on both sides of the aisle,

and even some people on this committee have introduced legislation around transmission, and I think it's important to take a hard look at these ideas. I think that any Republican legislation on transmission is something that could also appeal to Democrats, and I think we could partner together to have bipartisan legislation that would work. So, I'm looking forward to hearing our discussion from these witnesses and to hear about the challenges and opportunities that they're facing, and to help us explore some bipartisan solutions to building this out. Thanks, and I will yield back.

*Mr. Duncan. The chair will now recognize the full committee Chairwoman Ms. McMorris Rodgers for five minutes.

*Mrs. Rodgers. Thank you, Mr. Chairman. Good morning, colleagues, and welcome to our witnesses. Our energy dominance and reliable grid is what powers our way of life. For more than 100 years, generations of Americans have come to rely on electricity to the point that most of us don't even think about it anymore. This critical resource not only keeps the lights on, it heats our homes in the cold winter months and cools them in the summer. It's the reason that we

have fresh produce at the grocery store. It's how we're able to stay connected to our friends and loved ones. It powers lifesaving medical equipment in our hospitals and nursing homes, supports emergency services, and is foundational to America's banking system. Affordable and reliable electricity has raised our standard of living, driving technological innovation and improved our well-being. We should celebrate and build upon that legacy in America, take steps to build on the prosperity and ensure that people continue to have the opportunity for a better life.

America is at a crossroads. After decades of rapid growth and relative stability, our electric grid is becoming strained. According to the North American Electric Reliability Corporation, two-thirds of America, our nation, is now at risk for a power outage. We've seen increasing rolling black outs and brown outs and states move towards intermittent, weather dependent energy sources like wind and solar. They are phasing out more reliable baseload sources.

While there is certainly a place for wind and solar in an overall energy mix, we cannot rely upon them to power the whole country. In order to meet demand, we also need to

utilize our most affordable and reliable baseload sources like natural gas, nuclear, coal, and hydro-power plants. That is the best way to reduce emissions, keep energy costs low, and ensure that power is available for households and businesses. It will also help cut China out of our supply chains, which currently controls the critical materials necessary for sources like wind and solar.

The reality is that weather dependent wind and solar cannot achieve these goals alone. Just ask the people of California, a state that imports a significant amount of hydropower from Washington State to support its grid when inconsistent resources like wind and solar can't produce enough energy to meet demand.

Rather than a forced energy transition, we should be working to expand our energy resources through an all-of-the-above strategy. That's the best way to bring down costs for Americans who are currently paying more while getting less when it comes to electricity, and energy expansion will ensure families aren't having to make the tough choices about whether to pay the electric bill, fill up their gas tank, or buy groceries for their families.

We're having to conserve energy when it's hot or cold outside, and will ensure that people, not the government, are able to continue choosing the cars they drive or household appliances that best work for their lives.

As the nation's grid operators, our witnesses today face many challenges in making our complex electrical grid operate smoothly. ISOs and RTOs have an important responsibility to homeowners, businesses, hospitals, and beyond to make sure that our grid is reliable. I look forward to discussing how we can leverage a strong grid to boost our economy, raise our standard of living, and reduce emissions. Thank you, and I yield back.

*Mr. Duncan. The gentlelady yields back. I now go to the ranking member of the full committee, Mr. Pallone, for five minutes.

*Mr. Pallone. Thank you, Mr. Chairman. Today, the committee is discussing grid reliability. On a day that the House Republicans' own reliability is in serious question. There is nothing reliable about a government shutdown that creates a lot of unnecessary uncertainty. A reckless shutdown would hurt American families, damage our economy,

and threaten our safety. If extreme Republicans get their way, a shutdown would cut off pay for our troops, jeopardize veterans programs, and interrupt disaster preparedness.

Now, as far as grid reliability is concerned, vital programs at the Department of Energy will be forced to shut down, and the Federal Energy Regulatory Commission will have to wind down approvals for electricity rates under the Federal Power Act, which will slow the build out of the electric grid.

So, if my Republican colleagues are serious about reliability, they would reject the extreme elements of their party and join us in keeping the government open.

Now turning to the topic of today's hearing, roughly 25 years ago FERC issued order 888 to bring competition to electricity markets across the country. The regional transmission organizations, or RTOs, before us today are a direct result of that order. The developments of the last 25 years have made clear that power markets have promoted competition that has lowered wholesale energy prices and made the grid cleaner all while ensuring reliability.

In fact, some of the major blackouts we saw this past

winter occurred in the Carolinas and in the Tennessee Valley Authority service territory, which are both not served by a wholesale market, while the grid in the neighboring PGM territory was stressed but was able to prevent any major outages.

In fact, the only reason we even know about PGM's grid stress at all is because of RTO transparency requirements. Meanwhile, many of the utilities that operate outside of RTOs are a total black box, leaving customers in the dark about when or if they would have to implement rolling blackouts.

And this is not to say that the RTOs and organized markets are perfect, that government structures are impenetrable and often favor their incumbent utilities. I have serious concerns that consumer perspectives are too often ignored or that formal procedures for customer feedback do not actually translate into changes, and I'm interested in improving RTO governance and hope that can be done in a bipartisan way.

Having said that, the RTOs before us today have been a marked improvement over the opaque, vertically integrated grid operators they broadly replaced. I also believe that

proactively planning for the needed buildout of the grid and complying with FERC's recent order 2023 which reformed the inter-connection process will help build on those advances, and I look forward to hearing what each of the grid operators is doing to make those necessary advances.

Finally, as we talk about reliability, it's important that we recognize that electric infrastructure is only one part of the reliability conversation. Currently the majority of our power comes from fossil fuels, and if that fossil fuel infrastructure isn't reliable, then neither is the electric system that is built on top of it.

So last week I joined FERC and NERC examination of the reliability issues from Winter Storm Elliot concluded that natural gas outages were a major contributor to the outages that caused blackouts throughout parts of the country. And this -- and this examination included both natural gas powerplants themselves but also at the production wells and throughout the pipeline system in the Carolinas and Tennessee.

So, this demonstrates that natural gas has serious reliability challenges. FERC's current chairman and its

previous chairman have both called for Congress to pass mandatory standards for natural gas reliability if we're really concerned about grid reliability and stability, then it's past time for us to address this issue. After all, climate change is fueling extreme weather events all across the nation.

This presents dire reliability challenges to the grid that are only exacerbated by unreliable fossil fuel infrastructure, but fortunately the bipartisan infrastructure law invested $20 billion into strengthening the nation's power grid and making it more resilient during future extreme weather events. So, Republicans should join us in building upon these investments rather than opposing them and threatening a government shutdown. It's a lot better path forward to ensuring electric reliability.

So -- but I must say, Mr. Chairman, I mean, the biggest issue at hand here not only for reliability and energy and everything is to avoid this shutdown. And so I would hope that before shutdown Saturday or whenever that Repbulicans would join us and pass a continuing resolution. The Senate one that's coming over is really the only path at this point,

and with that, I yield back.

*Mr. Duncan. The Chair will now recognize himself, since we've concluded with opening statements, and I'll remind members that pursuant to committee rules, all members' opening statements will be made part of the record. So, now I'll introduce the witnesses. I want to thank all of you for being here today.

Mr. Ramey is a senior vice-president of markets and digital strategy at Midcontinent ISO. Mr. Gordon van Welie -- it is Welie? Okay -- president and chief executive officer of an ISO in New England. Mr. Paul Suskie, or Suskie? Suskie? Okay. Executive vice president of regulatory policy and general counsel for Southwest Power Pool. Mr. Richard Dewey, president and chief executive officer of New York ISO. Mr. Frederick Bresler, III, is senior vice president for market services for PJM inter-connection. Mr. Neil Millar -- is it Millar? Okay, or Millar? Okay. Vice president for infrastructure and operations planning for California ISO, and Mr. Woody Rickerson, senior vice president and chief operating officer for ERCOT, and I will now recognize Mr. Ramey for five

minutes.

You all will have some lights in front of you. Green, go. Red, stop. Five minutes, try to stay on time. We've got a lot of panelists, we want to get through this. I know you do as well, because those chairs are hard. So, Mr. Ramey, you're recognized for five minutes.

STATEMENTS OF TODD RAMEY, SENIOR VICE-PRESIDENT, MARKETS AND DIGITAL STRATEGY, MIDCONTINENT ISO; GORDON VAN WELIE, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ISO NEW ENGLAND; PAUL SUSKIE, EXECUTIVE VICE PRESIDENT, REGULATORY POLICY AND GENERAL COUNSEL, SOUTHWEST POWER POOL; RICHARD DEWEY, PRESIDENT AND CHIEF EXECUTIVE OFFICER, NEW YORK ISO; FREDERICK S. BRESLER, III, SENIOR VICE PRESIDENT, MARKET SERVICES, PJM INTER-CONNECTION, LLC; NEIL MILLAR, VICE PRESIDENT FOR INFRASTRUCTURE AND OPERATIONS PLANNING, CALIFORNIA ISO; AND WOODY RICKERSON, SENIOR VICE PRESIDENT AND CHIEF OPERATING OFFICER, ERCOT

STATEMENT OF TODD RAMEY

*Mr. Ramey. Thank you, Mr. Chairman. Good morning, Chairman Duncan, Ranking Member DeGette, Chair Rodgers, Ranking Member Pallone, and the subcommittee members. My name is Todd Ramey, and I'm senior vice president of markets and digital strategy at the Midcontinent Independent System Operator, also known as MISO.

MISO is the grid operator for a 15 state region spanning

from the Canadian border to the Gulf of Mexico right in the middle part of the country and in the middle of our eastern interconnect. MISO's role is to ensure the reliability of and the efficient operation of the combined generation and transmission system in our region. We also serve as the regional transmission planning coordinator to ensure that we have a future transmission system needed to support ongoing reliable operations as the industry landscape continues to transform.

In fact, the transformation to a lower carbon producing fleet is well underway in our region. Low carbon resources, primarily wind, solar, and batteries have grown from zero percent of our fleet in 2005 to represent roughly 25 percent of the installed generation in the MISO footprint today.

This trend has picked up momentum in recent years, and looking ahead we expect that by 2040, wind, solar, and battery resources will make up to 85 percent of the install capacity in our region. The growth in weather dependent resources has occurred in parallel with the retirement of significant amounts of dispatchable generators, primarily coal, gas, and nuclear resources.

Now, these investment and retirement decisions, in combination with the different operating characteristics of the new resources versus the retiring resources has reduced the reserve margins in the MISO footprint to the minimum required levels.

The challenging reliability characteristics, or rather the changing reliability characteristics of the fleet, along with more frequent weather events, are making the reliability planning and operating challenges more complex and more dynamic.

If I had to summarize MISO's perspective and experience into three main points, it would be these: first, the transition to a cleaner energy future with more weather dependent generators is underway, and the task of maintaining and ensuring reliability are more challenging today and more complex today than they were just a few years ago.

Second, the recent acceleration in the pace of fleet change is increasing risk to system reliability for MISO. Dispatchable generators that we need to ensure reliability are being removed from the system before new resources with the needed reliability attributes are being brought online.

Third, I would say that the changes can be managed and overcome through a comprehensive coordinated plan that ensures adequate capacity and sufficient reliability attributes are maintained and the investments in needed new transmission are able to navigate regulatory processes and construction in a timely manner.

MISO has engaged with our stakeholders over the last few years to develop just such a plan. We're working together to enhance and transform MISO's markets, our operations, and planning processes to maintain and ensure system reliability while enabling member and state clean energy goals. This includes work to improve our markets and reliability planning processes, and to ensure that appropriate signaling and prices for incentivizing the construction of resources with needed reliability attributes.

We also spend a considerable amount of time sharing our independent analysis and perspective on the implications of pending regulations and other fleet changes to help inform prudent investment and retirement decisions by our members. Mr. Chairman, this concludes my remarks, and I look forward to the discussion today on these important questions.

[The prepared statement of Mr. Ramey follows:]

**********COMMITTEE INSERT**********

*Mr. Duncan. Thank you so much.

Mr. van Welie, you're recognized for five minutes.

STATEMENT OF GORDON VAN WELIE

*Mr. van Welie. Chairman Duncan, Ranking Member DeGette, Chairwoman Rodgers, Ranking Member Pallone, and members of the committee, thank you for the opportunity to appear before you today. ISO New England is committed to working with the New England states and our stakeholders to enable a reliable transition to an economy powered by clean energy. This is a monumental task, and it requires four critical pillars to provide a robust foundation for the transition.

New England will need to add significant amounts of clean energy, ensure we have sufficient flexible resources to balance the renewable energy, ensure that we have sufficient back up energy for those periods when renewables cannot perform, and we will need to further build out the region's transmission infrastructure.

We're transitioning to a power system that will meet -- that will have to meet a doubling of average demand, and a tripling of winter peak demand by 2050. Moreover, this demand must be made with a resource mix where the majority of

Resources are energy constrained under certain conditions. Our challenge is figuring out how much energy we will get from this evolving set of resources, how to ensure reliability through the wholesale market design, and how to plan the transmission system.

The outlook for reliability is manageable, assuming certain assumptions hold up. These assumptions include a robust market design that assures resource and energy adequacy. Additionally, this assumes that the market will respond with new resources to meet increased demand and replace retiring resources, that there will be a reliable gas system and a responsive oil supply chain, that sufficient transmission will be built, that the region has access to imported energy, and that emissions restrictions on generators will be manageable.

ISO New England has been working with EPRI to conduct a probabilistic energy adequacy study for New England that provides a framework to assist risks associated with extreme weather events. We've done analysis on two initial time frames, 2027 and 2032. We believe the risks in the 2027 time frame are manageable primarily due to the positive effect of

significant regional investments in solar resources and energy efficiency, the committed resource mix for that time frame, and the significant investments in the market design and operated tools.

For example, we've developed tools to forecast a potential energy shortfall on a rolling three week basis. The variables and risks in the 2032 time frame are greater. However, these risks can be mitigated if the New England states, the ISO, and the FERC take proactive action.

The biggest long term risk is that the region cannot maintain sufficient resource of energy adequacy to meet the demand for electricity. This could be caused by the rate of electrification outpacing the addition of new resources, premature retirements, or the imposition of additional admission constraints on existing generators.

The single biggest variable affecting resource adequacy is the efficacy of the wholesale markets. The market structure is under increasing pressure to meet two objectives, reliability and decarbonization. Ensuring an effective and durable market design that can address both objectives requires strong support for market improvements

from both the state and federal regulatory community.

In particular, our studies have shown that as more renewables are added to the power system, it will put downward pressure on energy market revenues creating more reliance on capacity market revenues, or in the worst case, widespread reliance on contracts to retain selected resources for reliability.

The latter outcome will result in an unwinding of the wholesale market construct. I believe the most efficient market based solution to this problem is effective carbon pricing. In addition, New England has particularly severe gas pipeline constraints during the winter that limit the delivery of gas into the region. As a result, the generation makes switches to using significant amounts of oil and imported LNG.

As has been demonstrated in recent events and other regions, the electric and gas systems are interdependent, and a failure in one system impacts the other. ISOs have no jurisdiction over the natural gas system, and do not have the expertise to determine whether it will remain reliable throughout the energy transition.

I believe that policy makers and regulators should be thinking of the reliability of the energy system as a whole. In that regard, I commend the recommendations and the report on Winter Storm Elliot issued jointly by FERC and NERC. I would like to highlight the recommendation that legislation is needed to provide more oversight to the reliability of the gas system.

Congress established rigorous oversight and mandatory standards over the bulk electric system after the 2003 blackout, but has not established a comparable level of oversight and standards for the single biggest source of energy to that system. I urge this committee to support the report's recommendations, and take the necessary action to ensure the -- to assure the reliability of the energy system as a whole. Thank you.

[The prepared statement of Mr. Welie follows:]

**********COMMITTEE INSERT**********

*Mr. Duncan. I thank the gentleman, and now go to Mr. Suskie for five minutes.

STATEMENT OF PAUL SUSKIE

*Mr. Suskie. Thank you Chairman Duncan, and Ranking Member DeGette, and members of the subcommittee for the invitation to be here today. As stated earlier, my name is Paul Suski. I served as executive vice president and general counsel for Southwest Power Pool, also known as SPP.

Prior to my time with SPP, I served as chairman of the Arkansas Public Service Commission that gives me a unique perspective from both a state and regional level on the topics to be discussed today.

SPP, as stated earlier, is one of seven RTOs I the United States, and our service territory extends to 14 states, mostly in the Great Plains and the Midwest. FERC has tasked us and other RTOs with operating the electric grid reliably and efficiently, administering competitive wholesale markets, and performing transmission planning for the bulk electric system on behalf of our region.

To meet this mandate and serve the 18 million Americans in our footprint, we are empowered through a stakeholder driven process. SPP has taken proactive steps to address the

most imminent threats to reliability. These include among other things extreme weather events that are occurring in greater frequency than they have in the past, and an increasing demand for electricity that is occurring at the same time as a significant replacement of traditional baseload generation with variable energy resources.

The most important duty we have at SPP is to keep the lights on, and we do that with a large and diverse fleet of generating resources. As an RTO, SPP is fuel neutral, which is to say that our staff, our systems, and our FERC approved procedures do not distinguish between fuel sources. We are tasked with ensuring grid reliability on behalf of our members and our customers, and we do so with the lowest cost energy available at any given time to meet the region's needs for electricity.

As long as energy is available to be dispatched, we do not differentiate between renewables such as wind or solar and traditional baseload generation. Even without this preference, giving to one fuel source over another, the production of wind has grown tremendously over the last decade in our region. Wind is the number one source of

generation in SPP last year, with just over 37 percent of our energy coming from wind, meaning that over a third of the power that powers our homes and businesses come from wind energy.

And that's -- the same appears to be the case in 2023. In March of 2022, we set a wind penetration record, when over 88 percent of the load in our footprint was served by wind energy. Now, last year, coal was the number two source, making up 33 percent of our total energy, followed by natural gas with 21 percent. Nuclear and hydro also play a meaningful energy production role in our footprint, and moving forward, based upon our generation inter-connection queue, we believe solar will have an important role, with 41 percent of our inter-connection queue looking at a future comprising of solar energy.

This veritable fuel mix is key to our efforts to maintain reliability, that each source has its own strengths and weaknesses. Wind and solar, for example, have zero fuel costs, and lower environmental impacts than other generating types, but because they cannot be controlled, and we cannot count them to serve load when the wind is not blowing and the

sun is not out, we need to go to traditional resources.

The growth of renewables have had many benefits, but because the wind doesn't always blow and the sun doesn't always shine, we have to always have other generation on standby. As an example, on June 6th of this year, our wind production out of 32,000 megawatts of wind fell to 110 megawatts, and it feel from 5,400 to that 110 in just 16 hours, and as a result we had to rely upon other generation types to meet that.

As far as the weather mix and changing low growth, last year we set a new low growth of five percent above our peak at 56,000 megawatts on August 21st, and 20 hours in that month we exceeded the prior year's peak. So in conclusion, we know that it's important that we have reliability challenges in the 21st century. Our grid is changing, and we stand willing and able to address the undeniable change, work with our stakeholders, our neighbors, and our states to address the growing challenges in the future.

Thank you.

[The prepared statement of Mr. Suskie follows:]

689 **********COMMITTEE INSERT**********

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*Mr. Duncan. Thank you for your testimony.

I'll now go to Mr. Dewey for five minutes.

STATEMENT OF RICHARD DEWEY

*Mr. Dewey. Thank you Chair Duncan, Ranking Member DeGette, and members of the subcommittee for the opportunity to talk to you today about these important matters. My name is Rich Dewey. I'm the president and DEO of the New York ISO. Our responsibilities are to maintain the reliability of the New York power system and administer the wholesale energy markets and perform the important planning studies to prepare for our energy future.

Like most of my colleagues here, we're facing many of the same challenges of a rapidly transitioning electric grid. In New York state, we've got some unique responsibilities because of the passage of the Climate Leadership and Community Protection Act in New York which a legislature passed and the governor signed in 2019, which mandates by 2030 the electric load will be served 70 percent by renewables. By 2040, it will be a carbon free electric system, and by 2050, it will be a carbon neutral economy.

This presents some unique challenges and efforts within the state of New York, but we are committed to supporting the

policies of New York State, but ensuring that we can meet these policies only in the most reliable and the most cost-effective manner.

Some of the things that we are concerned about is the rate of exit of the existing resources is exceeding the rate of entry of the new resources. In order to make sure that we've got reliable services in place and we've got adequate resources on the electric grid, we do quarterly assessments to ensure that any reliability needs are addressed and we step in when we need to.

Most recently in July, we recognized that some of the emissions criteria and the new rules that were being implemented would create a reliability concern in New York City for the summer of 2025, so we inserted ourself into the process, worked with state government, and we initiated a process which could lead to the extension of some of those units that are targeted for retirement. We do that on a quarterly basis to make sure that we can maintain a reliable system and we're committed to doing that through the electric transition.

Energy markets we believe are a very valuable tool to

ensure that we've got the most economic resources to meet the reliability criteria. We believe it is the most cost effective means to procure those resources, and we also think it is the most -- if properly structured -- the most economic means to ensure the right kind of behaviors and attributes on the electric system to be able to maintain reliability.

When you think about the unique challenges of running an electric system, wind, solar, and storage, which are the prime technologies -- renewable clean energy technologies we have today, are very effective at reducing emissions, but it is not possible to run an electric system -- a reliable electric system on just wind, solar, and storage.

So, we make sure that our market rules are structured in place to protect and preserve the dispatchable resources that are going to be necessary to backstop and support the system during times when the wind isn't blowing and the sun isn't shining.

As you look forward to those targets of 2040 and a carbon free electric system, we are going to need resources that are dispatchable, that are responsive, that can ramp quickly, but do not emit carbon or other pollutants. Those

resources do not exist today, and it's going to be necessary to make sure we've got the right kind of market incentives to spark the kind of research, development, and development of those tools so that clean energy goals can be supported in a manner that does maintain reliability, but it's going to take innovation.

From a planning standpoint, we regularly 10 year and 20 year look aheads to identify needs that will become -- that will become present on the electric grid, and we take steps to ensure that we've got adequate resources in place to support that. These studies are critically important not only to maintain reliability, but to inform policy makers like yourselves and those in state government that are setting these targets and goals and passing legislation that supports our electric system.

One of the goals that -- or, studies that we recently did identified an outlook for 2040 to identify the types of resources that would need to be in place in order for New York State to achieve the clean energy goals that are stipulated in the legislation, and provide a pathway forward for establishing those goals.

Mentioned inter-connections, we are acutely aware that the inter-connection system is something that we need to be able to be more efficient at, provide an economic and more effective way for new resources to inter-connect to the grid, but we must not do that at the expense of reliability. The inter-connection system is critical to maintain the reliable operation of the existing grid while the new resources inter-connect.

We're committed to being able to do that faster, but we must not let speed by the enemy of reliability, and we've got to ensure that we've got adequate studies in place so that we can do that reliably. Thank you for the opportunity to talk to you today, and I look forward to questions later.

[The prepared statement of Mr. Dewey follows:]

**********COMMITTEE INSERT**********

*Mr. Duncan. Thank you, sir.

Mr. Bresler, you are recognized for five minutes.

STATEMENT OF FREDERICK S. BRESLER, III

*Mr. Bresler. Good morning, Chairman Duncan, Ranking Member DeGette, members of the subcommittee. Thank you all for the invitation to participate today. My name is Stu Besler. I serve as senior vice president of market services for PJM Inter-connection. In that role, I oversee the operation of all of the electricity markets that PJM operates, as well as the interregional coordination of those markets with our neighbors and their ongoing evolution.

The purpose of these markets is to cost effectively reinforce grid reliability, and as such, I'm here today to provide PJM's perspective with respect to the electric grid reliability, and our collective progress through the ongoing energy transition. Based in Valley Forge, Pennsylvania, PJM ensures the reliable flow of electricity to the 65 million customers that we serve, who lie in all or part of 13 states, plus here in the District of Columbia.

We liken our role to that of an air traffic controller but for the electric grid. While we don't own the high voltage transmission lines that carry the power to where it

needs to go, nor the generation resources that produce that power, we keep the lights on by directing and balancing the flow of that power throughout our region, as well as to and from our neighboring regions.

In addition to reliable operations management, PJM also plans necessary enhancements to ensure grid reliability in the future, and operates the electricity markets that I previously mentioned.

We operate those markets, again, to competitively procure capacity, as well as to efficiently dispatch resources to meet electricity demand in real time. As with the entire US electric grid, PJM is experiencing an accelerating transition towards a clean generation mix. Policies and consumer choices are shifting the grid away from dispatchable emitting generation resources toward resources with little to no carbon emissions, much of which is intermittent generation like wind and solar.

As generation resources retire, competitive markets have in the past and will continue to work to incentivize replacement generation. We are clearly seeing this occur in PJM particularly over the last decade or so as tens of

thousands of megawatts of primarily coal fire generation has retired, and a nearly equivalent amount of primarily natural gas fire generation has interconnected to the system.

Right now though, our current request to connect new generation resources to the grid is primarily and almost exclusively approximately 97 percent coming from renewable resources and batteries.

Today, the PJM fuel mix is diversified between different fuel types. As a direct result of competition, competitive markets -- sorry -- competitive markets' ability to attract investment into the PJM region, we currently enjoy our reserve margin of approximately 20 percent above our peak demand forecast.

However, as we look further out into the future and maintaining an adequate level of generation reserves, as well as the operational and physical attributes of those resources to support reliability will be crucial for PJM's ability to reliably serve electrical demand through the energy transition.

Based on our analysis, we have observed four trends that could increase the challenges we see in this area. First,

the rate of electricity demand growth will likely significantly increase in the future due to the electrification of transportation and heating sectors. Even in the near term, we are seeing significant increase in the development of large data centers, each of which consume high volumes of electricity.

Secondly, the rate of retirements of fossil fuel resources largely due to state and federal policies is clearly outpacing the construction of new renewable resources. Just as an example, in 2022 we saw only 2,000 megawatts of new resources interconnect to the grid, and only 700 megawatts of that was renewable. And this compares to about 30,000 megawatts of generation that was through our interconnection process, and therefore should have been ready to begin construction.

Third, as I mentioned earlier, replacement generation seeking to interconnect is made up primarily of intermittent and limited duration resources, such as wind, solar, and battery storage. These resources do not replace the resources that are retiring on a one for one basis. You need more megawatts of those resources to replace what's retiring.

And finally, the largely fossil fuel based dispatchable generators slated to retire at this concerning pace are those that have historically provided the grid balancing services we need to maintain reliability. In the -- in the longer term, other technologies like long duration storage could fill this role if they become cost effective and deployed at scale. That simply is not the case yet.

So, while PJM leaves the determination of policy to those of you and your colleagues at the state level, we urge that reliability considerations, including careful study of compliance dates and deadlines, along with potential for reliability safety valves be built into the analysis of potential policies moving forward.

We think hearings such as this one are a real positive step in that effort and look forward to working with this committee on these issues going forward, and so I thank you for the opportunity to be here and I look forward to the discussion.

[The prepared statement of Mr. Bresler follows:]

**********COMMITTEE INSERT**********

*Mr. Duncan. Thank you, Mr. Bresler.

I'll now go to Mr. Millar for five minutes.

STATEMENT OF NEIL MILLAR

*Mr. Millar. Good morning, Chairman Duncan, Ranking Member DeGette, members of the subcommittee. Thank you for the opportunity to testify here today. My name is Neil Millar. I serve as vice-president of infrastructure and operations planning at the California ISO. In this role, I leave the division responsible for the ISO's transmission planning, generation interconnection, and operations and engineering services.

The ISO operates the wholesale electricity market for the benefit of 80 percent of the electricity demand in California, and a small portion of the state of Nevada. The ISO also serves as a planning authority and overall network expansion project, transmission expansion projects in the ISO system, and administers the interconnection process for resources seeking to connect to those facilities.

Central to our functions are the objectives of reliability and affordability. In the broader -- broader western inter-connection, we also serve as the market operator for the western energy and balance market, which

provides real time market services to participating balancing authorities throughout the western inter-connection.

The western energy and balance market has increased reliability for its members, and generated over 4 billion in savings since its inception. We are now working to extend a day ahead market in the west with the tariff structure filed with FERC for approval earlier this year. We also provide reliability coordinator services to 42 entities operating in the western inter-connection which helps ensure we have prepared for and can manage reliability events.

Our transmission planning is carefully coordinated with California state agencies who are responsible for the states' load forecasts and resource procurement strategy. Our most recent annual transmission plan identified significant new infrastructure needed to reliably and efficiently meet California's clean energy goals over the next decade. The plan will support over 40 gigawatts of new resources identified by the state over the next ten years.

The transmission plan now under development will support -- will replace the 40 gigawatt goal and instead be supporting adding 85 gigawatts over the next 12 years. The

increase in resource requirements is due to increased load growth driven in part by increased electrification of other energy sectors, and establishing a trajectory to meet the states' long term energy goals.

The bulk of these new resources are expected to be inverter based resources, adding to the 17 gigawatts of solar, approximately 7 gigawatts of wind, and approximately 6 gigawatts of battery storage already on the grid. In the course of this transition, we will be continuing to rely on conventional resources, including nuclear, hydro, and gas fire generation.

As part of our transmission planning processes, the ISO also undertakes a 20 year transmission outlook. This work provides the context for near term transmission planning decisions, and can also inform policymakers' decisions on how best to shape future resource portfolios.

We are also enhancing our inter-connection rules to streamline the process and to increase the alignment between resource and transmission planning, inter-connection processes, and load serving entities' procurement activity. We applaud the recent order 2023 issued by FERC which

advances several areas of inter-connection reform nationwide.

We have also worked closely with FERC, with North American Electric Reliability Corporation, and the Western Electricity Coordinating Counsel and other stakeholders to ensure new resources, including inverter-based resources, are reliably integrated into the grid, and bring essential reliability services to the system.

We continually work to enhance coordination with our partners throughout the west, both in near term operations and long term transmission planning. Although the west has experienced supply scarcity during extreme events, western utilities have effectively supported each other during these events through widespread west-wide coordination.

We also see opportunities to coordinate resource adequacy programs, resource planning, and deployment of transmission infrastructure cross the western region.

Thank you for the opportunity to testify today. I will look forward to answering any questions you may have. Thank you.

[The prepared statement of Mr. Millar follows:]

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*Mr. Duncan. Thank you, and I'll now go to Mr. Rickerson for five minutes.

STATEMENT OF WOODY RICKERSON

*Mr. Rickerson. Good morning, Chairman Duncan, Ranking Member DeGette, and members of the subcommittee. My name is Woody Rickerson. I'm the senior vice president and chief operating officer for the Electric Reliability Council of Texas. I'm a registered professional engineer in Texas. I've been with ERCOT for over 20 years, and I've been in the industry for almost 30.

The Texas grid serves 90 percent of the overall load in Texas and covers approximately 75 percent of the state's land mass. This summer, Texas saw a peak demand of over 85,000 megawatts, which represents close to a seven percent increase over last summer.

We had over 40 days this summer where load exceeded last year's all-time peak. As we look into the near future, we see a grid that's undergoing a transformation. Load growth, new types of load, new types of generation, but perhaps the most overarching challenge in future years will come from the changing resource mix that provide that power. The bulk of my remaining remarks will focus on that challenge.

In 2008, the Texas grid had about 2,000 megawatts of wind generation. Today, we have over 37,000 megawatts of inter-connected wind. While clean and inexpensive wind generation does present some challenges. First, wind generation on the Texas grid tends to be in areas far from load centers, resulting in the need for substantial investments in transmission.

Second, wind output is variable. Even when disbursed over a state as large as Texas, there are times when the overall output can be very low. During the peak of the summer heat, there were many instances, many hours where the wind delivered less than a thousand megawatts out of the 37,000 that were connected.

And finally, wind generation provides us power to the grid using inverters or powered electronics. Reliably integrating inverter based generation has proven challenging in multiple ways.

In 2016, ERCOT began to see a rapid increase in the inter-connection of grid-scale solar. At that time, ERCOT had about 500 megawatts of grid scale solar. Today, there are over 18,000 megawatts of installed solar capacity.

Like the challenges experienced with wind generation, grid scale solar also uses inverters and in Texas it also tends to be located far from load centers. Unlike wind, solar has a predictable ramping periods in both the morning and the evening, but these ramps present grid operators with their own significant balancing issues.

The newest edition to the resource mix have been batteries. With almost 5,000 megawatt hours of capability in ERCOT now, the batteries have moved into the ERCOT ancillary services market and become valuable contributors during ERCOT's tightest hours. Batteries were extremely useful, providing quick responses to system events, mitigating the variability of wind generation, and helping to dampen the effect of solar ramps.

However, batteries also present new challenges for control systems and forecasting, one of the most pressing being their duration limits. The large scale integration of these types of resources remains a complex issue requiring additional changes to the ERCOT operating rules and systems.

Looking ahead, almost half of all projects currently in the ERCOT inter-connection queue are for new grid scale solar

projects, and another one third are for batteries. Wind, solar, and battery resources are providing much needed capacity and benefits to the Texas grid, but to meet the rapidly growing electric demand, it's critical that the generation supply be balanced with long duration dispatchable generation, like natural gas and nuclear. Those thermal generation resources still supply almost 70 percent of the ERCOT energy needs in our growing inter-connect.

As we look at grid reliability this winter, there are several important factors to consider. Severe winter weather presents challenges for all types of generation. Wind turbines can be forced offline due to icing of turbine blades, solar panels can be covered with snow, peak load hours during the winter will likely occur in early morning hours before generation from solar is online, and in the evening hours after the sun sets.

Thermal plants are also more susceptible to forced outages and fuel delivery issues during winter storms. However, since Winter Storm Yuri, ERCOT has put programs in place to help mitigate these risks. We now have a winterization inspection program that made more than 600

plant inspections last winter to ensure good winter performance, and during Winter Storm Elliot we did see improved results.

ERCOT also has a firm fuel program to provide incentive for units to store fuel onsite when possible. Finally, the energy transition currently underway must keep reliability and cost in constant focus, and will require careful planning, time, and meaningful advancements in technologies that are still being developed and standardized. So, thank you this morning for the opportunity to speak, and I look forward to answering any of your questions.

[The prepared statement of Mr. Rickerson follows:]

**********COMMITTEE INSERT**********

*Mr. Duncan. I want to thank all of our witnesses for your testimony, and we'll move into the question and answer portion, but you'll see a lot of members coming and going. There's another hearing today, and O&I, Oversight and Investigations, on the Hawaii fires and the grid situation down there.

There's a lot of overlap, a lot of members have an interest in that, including me, and I will even at some point allow someone else to chair for a period. Just wanted the witnesses to know why members are bouncing around today. So, I'll now begin the questioning, and recognize myself for five minutes.

Many of your organizations have warned about the looming electric reliability crisis that is driven by misguided state policies, EPA regulations, and utility decisions to retire most -- our most reliable, readily dispatchable power generation. Heard that as a theme today. The current pace and scale of power plant closures is threatening your ability to keep the lights on.

Mr. Bresler, PJM is expected to lose 40 gigawatts of reliable generation, primarily due to coal and gas retirement

by 2030. That's almost one-fourth of your total capacity. What concerns you the most about losing so much coal and natural gas generation so quickly?

*Mr. Bresler. Well, I think there's two aspects to that, Mr. Chairman. The first is overall resource adequacy, making sure that resources come on the system in sufficient quantities with sufficient reliability value to be able to replace those that are retiring, and then secondly in the longer term maintaining the grid services, the flexibility, the ramping capability, those types of operational services are required to operate a reliable grid. So, it concerns us from both those aspects.

*Mr. Duncan. Okay. Thank you for that. Mr. van Welie, ISO New England wrote to President Biden last year that during the coldest days of the year, New England does not have a sufficient pipeline or enough structure to meet the region's demand for natural gas. You need natural gas for power plants, correct?

*Mr. van Welie. That's correct, and because of those constraints, we're really dependent on imported natural gas from other parts of the world, so, have to work around the

pipeline constraints, and we also become very dependent on burning oil during the wintertime. So, I think it's unlikely that we will see pipelines built in New England. The last time the governors were behind this was in 2014, and the focus -- now, the policy focus is basically to ween ourselves off natural gas, but that’s going to be a journey.

*Mr. Duncan. You've got natural gas coming in by LNG ships, sometimes from our adversaries, we all know the stories of Russian LNG ships in the Boston Harbor. Natural gas can be delivered by a pipeline or a tanker, isn't that correct?

*Mr. van Welie. That's correct. One of the big discussions last year was whether there would be sufficient LNG making it into the region, and there were a lot of letters written looking at domestic natural gas via ship to New England, but that's not possible because of the constraints of the Jones Act.

*Mr. Duncan. And the need for American flag flown crewed ships that are Jones Act compliant, and there's another industry that needs to be stood up in this country. Are you frustrated that state lawmakers have ignored your

warnings about the lack of natural gas supply and the impact it's having on reliability in your electric grid?

*Mr. van Welie. I accept the policy imperative, so you know, if you speak to these five of the six states in New England, the policy imperative is to move towards clean energy as swiftly as possible. So, the question then becomes how do you work with what you've got and be realistic about what you've got and make sure that you retain what you have and don't let it retire before you get the new resources online.

*Mr. Duncan. And always pushing for, you know, New England is not alone. South Carolina had resource adequacy issues with the need for natural gas and natural gas pipeline capacities and a point of criticality for our state. That's why Mount Valley Pipeline was so important to the southeast to free up capacity.

Mr. van Welie and Mr. Dewey, I'm going to ask you both this, and I guess Mr. Bresler too. Some are under the illusion that offshore wind is a silver bullet to your reliability problems. However, we're learning that projects off the coast of New Jersey, New York, and Massachusetts are

all facing significant cost overruns and questions about reliability. In July, Governor Murphy signed a law that would require New Jersey rate payers to bail out a Danish wind developer.

Developers in Massachusetts and New York are also asking for bailouts to continue their projects. Are you following these trends affecting offshore wind projects with the cost overruns and construction delays, and I'll start with Mr. van Welie?

*Mr. van Welie. Yeah, we are. That's one of the things that worries us in the longer run. So, if that resource comes online on schedule, we'll be much better off obviously than if it's late, and we are seeing significant delays. The first couple of projects should come on time, but the remaining projects are the ones that are in trouble, and obviously turning to Rich Dewey about this before, it's really a global problem at the moment.

*Mr. Duncan. Yeah.

*Mr. van Welie. We see the same issue in Europe.

*Mr. Duncan. Mr. Dewey, answer that too.

*Mr. Dewey. Yeah. Thank you, sir. Yes, we are

tracking that exceedingly closely. Offshore wind presents tremendous promise in the -- in the fact that it performs better than onshore wind and interjects directly into the load centers into New York City, but the timing of these projects needs to be carefully coordinated with any planned exit of resources, and we have been -- we have been pretty vocal about the need to retain those fossil based resources until and unless we can verify that those are reasonable.

*Mr. Duncan. And cost overruns and bailouts too. Mr. Bresler?

*Mr. Bresler. Sure. While actively planning for the integration of those resources, I'll just say that it contributes to our concern about resources coming online in a timely manner to replace what we anticipate to retire.

*Mr. Duncan. Yeah. Thank you for that. Let me just say for the record that Republicans are all of the above. We like wind and solar, we like renewables, we also know what works and we know what's needed to keep the grid reliable and affordable for our constituents and the citizens of the country. My time is expired, so I'll now go to the Ranking Member DeGette for five minutes.

*Ms. DeGette. Thank you, Mr. Chairman. Well, what you just said is what leads me to believe that we can actually work on some bipartisan solutions and I hope we can do that. Mr. Bresler, can you briefly explain what advantages wholesale electricity markets can offer us as it relates to reliability?

*Mr. Bresler. Sure. Thank you, Ranking Member DeGette. The benefit of competitive markets is the -- is leveraging the power of competition in order to drive investibility (phonetic) in market and the infrastructure the grid needs in order to maintain reliability, and that's exactly what we've seen occur in PJM.

*Ms. DeGette. Does anyone want to add to that?

*Mr. Dewey. I will further add that it moves the risk off of ratepayers onto investors and private companies, which is a tremendous -- which is a tremendous advantage and a protection for consumers, and when we see some of the challenges we have as mentioned by the chairman with some of these offshore wind contracts where the companies are seeking additional funds into their contracts, the market mechanism would protect consumers from that.

*Ms. DeGette. That's right. Thank you very much. As I mentioned in my opening statement, I think transmission is a major way to help increase generating assets on the grid, cut down on congestion on the grid, and help promote reliability on the grid.

So, I have in my best John Dingell fashion a set of quick yes and no questions that I'd like to go down the panel -- this very large panel and ask, and I think it should be easy, not hard. So, I want to ask all the panelists, number one, the amount of electricity that Americans are expected to consume is -- or are going to consume is expected to increase over the next few decades. Is that right, Mr. Ramey?

*Mr. Ramey. Yes.

*Mr. van Welie. Yes.

*Ms. DeGette. Please excuse me, that's my child.

*Mr. Suskie. Yes.

*Ms. DeGette. They always answer the phone, yes?

*Mr. Dewey. Yes.

*Mr. Bresler. Yes.

*Mr. Millar. Yes.

*Mr. Rickerson. Yes.

*Ms. DeGette. Thank you, and regardless of the generating source to accommodate this increase, we will need more transmission. Is that right, Mr. Ramey?

*Mr. Ramey. Yes.

*Mr. van Welie. Yes.

*Mr. Suskie. Yes.

*Mr. Dewey. Yes.

*Mr. Bresler. Yes.

*Mr. Millar. Yes.

*Mr. Rickerson. Yes.

*Ms. DeGette. So, last yes or no question. Do we need to increase the pace of our transmission deployment to meet that need? Yes or no?

*Mr. Ramey. Yes.

*Ms. DeGette. The pace -- yeah.

*Mr. van Welie. Yes.

*Mr. Suskie. Yes.

*Mr. Dewey. Yes.

*Mr. Bresler. Yes.

*Mr. Millar. Yes.

*Mr. Rickerson. I think it depends on the word build,

but yes.

*Ms. DeGette. In general. Yeah, okay. Now, I know some states, including my state of Colorado, have ambitious climate goals, some through executive action, and some in statute. Colorado, for example, has a requirement for utilities to significantly reduce emissions by 2050, but I know that there are concerns that RTOs with dirty fuel mixes could impact those goals. So, Mr. Suskie, I want to ask you, since some of the Colorado utilities are entering into contracts with SPP, what actions are you guys taking to ensure that utilities in states with climate goals won't sacrifice those goals by joining or by being a member of your RTO?

*Mr. Suskie. Yeah, great question. What we've done in our current footprint, we do have one state that does have carbon reduction greenhouse gas goals, and they hit RPS standards. Through our consolidating 17 balancing authorities into one, having an integrated marketplace that dispatches a day in advance, and getting the significant amount of renewables online, we've been able to not only meet the state goals, to exceed them, and with particular states

in the west, particularly Colorado, we're looking at dispatch of the market to comply with state laws in a manner that will make sure they meet those goals. All of the state mandates we have in our current footprint have been met and exceeded, and we continue to exceed those in the future.

*Ms. DeGette. Congratulations. That's great. Mr. Bresler, can you briefly respond to the same question?

*Mr. Bresler. I'm sorry, Ranking Member DeGette, could you repeat the question for me?

*Ms. DeGette. Yeah. So, what actions are you taking to make sure that utilities in states with climate goals won't sacrifice those goals by joining or being a member of your RTO?

*Mr. Bresler. Well, again, you know, our strategy is to facilitate the policy goals of those that are in our region, and so we are actively planning to expand the transmission system to accommodate those, and we are leveraging our markets and making sure that we accredit resources properly for the reliability value they bring so that we get the total amount of capacity we need in the right locations, so all that works together.

*Ms. DeGette. Right. Mr. van Welie? Oh, there you are down there, sorry. Same question.

*Mr. van Welie. Well, I -- I'll come back to something I said in my testimony. I think the long term solution here is to put carbon pricing into the market. I think the markets are not going to survive unless we do that. So, renewables which have zero fuel costs are going to drive energy market prices down, they're going to create the reliance on a supplementary revenue mechanism, these are the capacity markets, and the way to have those two markets being balanced is through carbon pricing. So, I think that's a thing that we've been advocating for for a long time.

*Ms. DeGette. Thank you. Mr. Ramey, I have the same question for you, and I'll ask you to respond in writing because my time is up. Thank you, Mr. Chair.

*Mr. Duncan. The gentlelady yields, and the now the chair recognizes the chair of the full committee, Ms. Rodgers, for five minutes.

*Mrs. Rodgers. Thank you, Mr. Chairman. I think we all agree that affordable and reliable electricity is essential. It's essential to our nation's economy. It's essential to

our nation's national security. The facts are pretty troubling. Utility bills are skyrocketing. They're up 30 percent since President Biden took office, and we have a reliability crisis.

NERC says two-thirds of the country is at risk of outages, and many of you all have been warning your customers to conserve power, to avoid charging electric vehicles, prepare for rolling blackouts, and you know what? That's not serving Americans well. The high utility bills and the reliability crisis that we're facing is a direct result of the overreliance on weather dependent and inconsistent wind and solar energy.

It's pretty simple. Utilities are retiring most of their affordable and reliable power plants and they're building wind and solar for three main reasons. Punitive EPA regulations, unrealistic state mandates, and federal tax subsidies for wind and solar that I guess you can say makes it free. It's not really free.

While the current conditions are great for the profits of renewable energy developers, the costs are passed onto the consumers, to Americans, through high electric bills and

rolling outages. So, my question to all of you to begin, yes or no? Do you believe that you can operate the grid on one hundred percent wind and solar, or does anybody believe that you can operate the grid on one hundred percent wind and solar? Anyone want to raise your hand?

*Mr. van Welie. I'll raise my hand. I think it depends on whether you have storage in your system. So in the long run, you have to develop sufficient storage to --

*Mrs. Rodgers. Some day.

*Mr. van Welie. -- be able to deal with --

*Mrs. Rodgers. Some day. Some day we may have this storage.

*Mr. van Welie. Correct.

*Mrs. Rodgers. In the meantime, probably not. Okay, Mr. Rickerson, Texas is an interesting test case. So, in Texas, we hear about the economy booming, electric demand is growing, we built more wind and solar than any other state in Texas, and your grid has held firm, Texas is still facing serious reliability challenges. So, what are the state of Texas and ERCOT doing to improve the reliability of your grid?

*Mr. Rickerson. Well, we have an open connection process for new generation, and we do see some encouraging trends there. One of the most encouraging are the number of batteries have over a thousand megawatts of new batteries that want to interconnect with the system. We recently put in a new distribution generation interconnection process so that small generators could locate near load. By locating near load, they reduce the need for transmission, and that process has been successful, and we do see a lot of distribution generation located on the system.

So, those two things together I think are some encouraging trends, but in the long run, it's going to take a balance of dispatchable generation. We're going to have to continue to have dispatchable generation. The technology is just not there yet for a fully inverter-based resource space.

*Mrs. Rodgers. Thank you. Thank you. Where did those batteries come from?

*Mr. Rickerson. I don't know the sources of the batteries, but I --

*Mrs. Rodgers. Where do the small generators come from?

*Mr. Rickerson. Individual developers bring us those

projects. I don't know their origins.

*Mrs. Rodgers. Okay. Can you talk about the benefits of natural gas and baseload generation to the stability of the energy grid? Natural gas that has done more than anything to bring down carbon emissions?

*Mr. Rickerson. Absolutely.

*Mrs. Rodgers. One of the best things that we can do for the world?

*Mr. Rickerson. Absolutely. The ERCOT grid is highly dependent on natural gas generation. On any given day, that is a -- that's our bread and butter. That's what keeps the grid working as we look at the variability of wind --

*Mrs. Rodgers. Thank you, thank you. My time is going to run out here very quickly. Mr. Millar, California has been the most aggressive in the renewable mandates, the highest energy prices now in America. The management of the California ISO is unique with its leadership and governing board being appointed by Governor Newsome. California also relies heavily on energy from other states. I represent Washington State. We send --

*Mr. Millar. Yes.

*Mrs. Rodgers. -- our hydroelectricity to California to keep their lights on. So, yes or no, ever since the widespread rolling blackouts in 2020, California's grid has been near a perpetual state of emergency. Do you agree that a lack of baseload generation and high degree of variable wind and solar is driving reliability challenges?

*Mr. Millar. No, our reliability challenges have been primarily impacted by the wider range of extreme weather events that are largely attributable to climate change. As I mentioned in my opening comments, we do rely heavily on natural gas to provide critical capacity when the system is stressed. We're also relying more heavily on renewable generators --

*Mrs. Rodgers. Excuse me. Excuse me real quick --

*Mr. Millar. -- to reduce -- yes?

*Mrs. Rodgers. Would you speak to the nuclear plant that you've had to put back online in California to keep the lights on?

*Mr. Millar. Diablo Canyon stayed online. It didn't go off, so it has --

*Mrs. Rodgers. But it was scheduled to be --

*Mr. Millar. -- it has been extended.

*Mrs. Rodgers. -- shut down, and the governor had to intervene, and we're having to give money, we're having to give extra resources, and expedite permits that no one else gets in America to be able to get it back online to keep the lights on in California. I yield back.

*Mr. Duncan. The gentlelady yields back. The chair now recognizes the gentleman from California, Mr. Peters for five minutes.

*Mr. Peters. Thank you, and I would like to thank Mr. Duncan for holding this hearing on gridlock reliability. I want to work with you and your colleagues on reforms to make a safe and secure and adequate electric grid and discuss repeatedly to this committee how increased interregional transmission capacity could deliver a reliability and cost benefits to the American consumer. Unfortunately, we are terrible at building it.

Since 2014, America -- North America has built or is nearing building just seven gigawatts of high capacity interregional transmission lines. This comes as top reliability experts warn of insufficient transmission for

large power transfers.

So, that's North America is seven, the comparable numbers for South America is 22, Europe, 44, and China, 260 gigawatts worth of high capacity interregional lines. Between 2016 and 2018, China started and completed a single line over 2,000 miles long capable of carrying 12 gigawatts, nearly twice the build of the entire North American continent over a period several times as long. Permitting and citing challenges are an obstacle and are working on those and have introduced legislation to address some of those concerns, but I will hope to understand the role of RTOs today in interregional transmission, FERC order 1,000 gave the RTOs a framework for advancing interregional transmission planning, but since then an ever-growing list of government industry expert reports have identified and have identified interregional transmission as one of the most cost effective reliability and resilience tools at our disposal.

Winter storm events in recent years have empirically shown the role it has to keep -- to play -- it has to play to keep the lights and the heat on, yet the RTOs -- I'm not sure they have the incentive or the interest in investing in

interregional transmission. There have been zero interregional transmission lines of significance advance through traditional planning processes, and the independent developers advancing interregional transmission projects often point to inconsistent and inequitable treatment in RTO processes as a major road block to building lines.

So, some of you have mentioned transportation or transmission planning as part of your testimony. By the way, I just want to say Mr. Welie, I want to thank you for mentioning carbon pricing. I think it is -- we are going to head there some day. It is the most efficient way to allocate resources to drive incentives.

It would save the government a ton of money, and it would save the Department of Energy from having to set up all these programs. I'm a big fan of it. I voted for the IRA. I thought it was an important step, but in many ways a second best way to address this issue, and I appreciate you saying it.

I hope we get there like the rest of the world. But you said imported energy is part of the mix. What's your organization doing to -- how do you devote a plan and

resources to make sure that we do build interregional transmission that serves New England?

*Mr. van Welie. So, we are very focused on the transmission planning that needed to build out the system both to meet the peak demand that I had described but also to integrate the renewables. One of the dimensions of that is looking to our neighbors that have an additional resource in New England that's mainly looking north to Canada, to Quebec, and now conversation has started again about the Atlantic, the maritimes.

We were in a conversation in New York, I think the most productive conversation between us in New York is around how do we integrate the offshore wind together?

*Mr. Peters. Okay. Is there anyone on the panel who disagrees that interregional transmission would help with reliability?

*Mr. van Welie. I have one caveat, though.

*Mr. Peters. Okay.

*Mr. van Welie. So, I don't think it's a silver bullet. I'm in favor of much more transmission for the reasons that I've just mentioned, but the one thing we need to be careful

about is that transmission is not going to solve a problem when you have a very large weather event that impacts multiple regions simultaneously. Then you need to make sure that there's enough resources in the system.

*Mr. Peters. No, I never suggested that. I would never suggest it as so soon, but you know often my colleagues talk about all of the above. It's hard to have all of the above if you don't have any wires to hook up to it. And so, I think it's obviously, from the studies we've seen, that it's an important component of reliability.

I'm interested in what maybe if anyone has some suggestions about what the federal government could do to incentive individual RTOs. I mean, I saw the map of the Midwest, all those plans are within the region. How would we incentivize the building of interregional transmission that could provide more reliability, and does anyone have an idea for me?

*Mr. van Welie. I think the problem that needs to be solved is cost allocation.

*Mr. Peters. Okay. Mr. Dewey?

*Mr. Dewey. I was going to say the same thing, cost

allocation. We've had tremendous success in New York with building transmission within New York using FERC order 1,000 and the cost allocation rules associated with that. But when you cross state lines and you cross region lines, the agreements of who is going to bear those costs and in what quantities has been the challenge, and I think that there's an opportunity to work with the states to forge an agreement. I think there's a willingness to do it, but coming up with that exact split has been a challenge.

*Mr. Peters. Okay, that's one of our challenges here, and I look forward to working with you all, and I yield back.

*Mr. Johnson. The gentleman yields back. The chair now recognizes the gentleman from Texas, Dr. Burgess, for five minutes.

*Mr. Burgess. Thank you, Mr. Chairman, and Mr. Rickerson, thank you for being here today and giving the unique position that you hold and ERCOT holds in the country, and certainly you are correct this summer has kind of provided a case study, it's always hot in Texas in August. I mean, it was a headline, but you know, it is hot in August, and the reason it's hot is because one of these high pressure

systems that usually starts in the Rockies somewhere settles in over us, and the high pressure system, the wind doesn't blow. That's just the way it is.

So, your wind generation goes way down. Solar generation, man, good on us, it's up, but then dammit, the sun goes down, and just about the time the sun goes down and everybody hits the back door and says, my god, it's hot in here, crank up the AC. So, I was worried about you, and I know you were worried about ten or eleven times as I recall --

*Mr. Rickerson. Correct.

*Mr. Burgess. -- during the summer, but good for you. It did manage to balance, but that is one of the unique challenges that you guys face, is that not right?

*Mr. Rickerson. Yes, you're -- that's exactly right. It is that even with the large amount of wind and the large amount of solar, we see quite a bit of variability, and when we have scarce hours, we'll have one day that's 105, and we don't have any problems at all because we have plenty of wind generation, and we'll have another day where it's very scarce because of the variability of the wind.

So, I think having a balance of dispatchable generation continue as part of the ERCOT grid is going to be really important going into the foreseeable future. The technology for a non-synchronous type generation grid is just not there yet, and it's going to take years for that to advance, and in that meantime we need a bridge to be able to get to the future, and that bridge is going to be thermal dispatchable generation.

*Mr. Burgess. Yes, sir, absolutely, and I do an energy efficiency summit every year in my district because I usually do it in July when people's bills are the highest because I think that's when I'm going to be able to get their attention. ERCOT was very kind and sent our former colleague, Bill Flores, to come to that event, and give us a perspective of ERCOT for constituents in the area, and he did talk about the fact that there's a lot of people moving to Texas.

So, it is -- yes, it is hard to plan for the variabilities of the weather, but you also know that you've got an incoming consumption base that is not slowing down and not going away. So, you've got to balance all of those

things together. Is that not correct?

*Mr. Rickerson. That's right, and it's about a seven percent load growth.

*Mr. Burgess. Just to put that in Congressional terms, Texas over the last two censuses has gained six Congressional representatives thanks to Ohio and California. We'll take good care of them, but that's the -- that's the good type of growth that we're seeing in Texas, and that -- those types of demands -- and the reason I bring that up is 2011, it was kind of back before we named our winter storms.

*Mr. Rickerson. Right.

*Mr. Burgess. But in 2011, we had a really bad -- not as bad as 2021, but we had a really bad cold snap, and the governor at the time, Governor Perry and Lieutenant Governor Dewhurst said, we are going to build 18 new coal plants so that we don't get behind with our generation for our rapidly growing state.

But then of course they were not allowed to build those plants, and they did the logical thing and built natural gas fire plants. Good for them. Probably those combined cycle gas generating plants are a more efficient way to go about

that type of generation, but I don't know that we've kept pace.

Yes, the wind load -- solar load, all important parts to the all of the above. You mentioned grid scale battery storage. That's -- I visited one of those plants not too terribly long ago. I think they use a gas generator though to charge up the batteries, so that may be a mixed blessing there.

*Mr. Rickerson. Yeah, you're absolutely right. Batteries don't produce energy. They simply move it from one time period to another. I've got some numbers here that might interest you. In 2008, and this is before 2011 -- since 2008, we've had 23,000 megawatts of increased load, and we've had about 1,500 megawatts of thermal generation installed since that time.

*Mr. Burgess. Yeah, and then clearly that's an imbalance?

*Mr. Rickerson. Yeah, we're losing the balance.

*Mr. Burgess. And you guys depend upon balance, as I recall.

*Mr. Rickerson. That's right.

*Mr. Burgess. That's the R in your acronym, the reliability part of ERCOT. Well, thanks so much for being there and sharing the ERCOT story with Congress. I know we've got a lot of work to do. You all have a lot of work to do. I'll call my state legislature and make sure that they pay proper attention to you.

*Mr. Rickerson. Thank you.

*Mr. Burgess. Thank you, Mr. Chairman. I'll yield back.

*Mr. Johnson. The gentleman yields back. The chair now recognizes the gentlelady from Texas, Ms. Fletcher, for five minutes.

*Ms. Fletcher. Thank you so much, Mr. Chairman. Yeah, there are a lot of Texans on this panel as you know, and I'm glad to follow my colleague. You'll hear from several of us today, and I appreciate all the witnesses who are here. Obviously my questions are generally a focus for Mr. Rickerson today, with a focus on ERCOT, but hearing about all of the work you do is particularly important as we -- people across the country address the very same questions that you're talking about today, and I do want to take just a

minute of the beginning of my questions to associate myself with the opening statement of Ranking Member Pallone because I think it's ironic that in this hearing on reliability we are talking about shutting down the government, something that people across the country rely on every single day and expect to be working, and what I hear from my constituents consistently is that uncertainty, a lack of predictability, a lack of reliability, are major impediments for them.

That said, I do want to focus on electric grid reliability. That's what we're here to talk about today, and I want to point out, you know, I agree with some of the comments you've already heard and we'll continue to hear, I think what I hear from folks across not just my own district in Houston, but really throughout the industry is that Texas's independent grid really allows for creativity, innovation, it's not just the grid, the market, right, allows for this incredible creativity and the open markets really make it possible for so much to be kind of this laboratory, right, of experimentation in terms of fuel sources and types of fuels.

And so, I do want to point out for some of my colleagues

here who may not -- who may not know as we talk about the changes and the changing mix of energy sources on the grid, so much of the innovative forward thinking work that we did in Texas was brought about by our Republican governor, Governor Perry, and others 20 years ago thinking about wind, thinking about transmission, making sure that we were moving those resources so the development of wind in particular and also of solar in Texas, and the new technologies that I think are coming. Certainly, I know a lot of people who are excited about the potential in Texas and elsewhere for geothermal and other technologies. Those things are finding a home in Texas and I think it's really important.

That said, we, as Mr. Burgess just talked about, are experiencing reliability issues. And so from the consumer side, from the concerns that we share, I have some very specific questions for you about the timeline, thinking about reliability. What is the timeline, Mr. Rickerson, for ERCOT and the PUC to develop the reliability standard?

*Mr. Rickerson. So, we were working hand in hand with the PUC right now doing some iterative studies with them. We expect to have the bulk of that study done by the end of the

year, and then the policy decisions will follow that.

*Ms. Fletcher. And you think you're on track to meet that end of the year deadline?

*Mr. Rickerson. We are on track to meet that.

*Ms. Fletcher. And does ERCOT anticipate that the current market can meet the reliability standard that you're developing?

*Mr. Rickerson. It's hard to answer that until we see what that reliability standard is. I'm not for sure where the PUC is going to put that standard.

*Ms. Fletcher. Okay. Kind of on a related note, how will the recent market changes that the legislature enacted on the PCM contribute to meeting the reliability standard or not meeting the reliability standard?

*Mr. Rickerson. I think that remains to be seen as well. I think that the -- some of that still needs to be approved later this year, and we'll find out pretty quick if it's going to have the desired effect of providing some incentive for more dispatchable generation.

*Ms. Fletcher. Well, thanks for raising that, because I think that's one of the concerns that I hear a lot is about

the incentives for generation, and obviously generation of all kinds of energy and getting those sources to the grid, and I certainly agree with my -- with the comments from Mr. Peters as well about the importance of building out our transmission infrastructure as well, but you know, it really is key to having a resilient grid, and I think what we've seen in Texas -- I think the example from Texas is that we have seen that energy mix of having reliable baseload power is aby essential, and obviously in Texas we have natural gas and nuclear.

We don't have some of the other sources that our friends in other parts of the country have. We don't, you know, rely on hydropower in the same way. I know we did a hearing on that last week, but we have natural gas, we've got nuclear, we've got good, you know, dispatchable baseload power, but we also are seeing that the renewable sources are coming in in these times of peak demand and that we've had tremendous output from solar in particular.

You mentioned that wind was not producing as much as you expected in your testimony over the summer at certain key times. But there's a lot of concern right now that the

market structure in Texas is going to lead to basically just higher prices for consumers and not employ -- and not incentivize the deployment of additional generation. So, I'd want to ask about this new service that ERCOT came up with, but I am running out of time.

So, what I'm going to do is submit a couple questions for the record for you because I couldn't get to everything, but I really appreciate having this hearing, Mr. Chairman. I think it's really important that we continue this conversation, and I thank you very much -- I thank you all for your testimony.

*Mr. Duncan. And I thank the gentlelady for the questions, and then I'll go to the chairwoman of the full committee, Ms. McMorris Rodgers. Oh, I'm sorry? Oh, Mr. Guthrie is next. I'm sorry. Mr. Guthrie from Kentucky is recognized.

*Mr. Guthrie. Thank you. Thank you, Mr. Chair. Thank you, the ranking member, for holding this meeting today. Thanks. Mr. Bresler, I've got a question for you moving forward in this context. So, in your written testimony, it mentions that PJM facilities -- facilitates the export of

import -- export or import of power to and from interconnecting neighboring systems looking at reliability. One of those systems that you have one of those agreements with is Tennessee Valley Authority, which serves much of my district.

And as you know, this past winter during -- the whole southeast was dealing with the record cold temperatures and we had rolling blackouts in my area, it is I think the first time in TVA's history. TVA has a proud history. I have family roots in the mussel shells area. And so, I've always been proud of TVA moving forward, but they did not have adequate capacity.

They also shut down a coal plant in Middleburg County in the town of Paradise. And so just a concern, I know I was at the Paradise plant, and they said, well, it could have just been the cold weather was working on the valves of the plant, and if we had extra capacity -- it may not have matter, but I will tell you due to the Inflation Reduction Act, they're building a massive battery plant in my area, which we're glad to have in our area.

However, I know that TVA has concerns about having to be

able to support -- supply energy as they move forward, and when we question that, and we questioned that in a hearing in a different committee, and we were accused of being pro-Chinese, bussing people on the other side, because we were questioning whether we can build electric cars unless we deal with the grid and the reliability of the grid. So, that's a big concern of ours, and I know part of TVA's contingency planning is to import power from PJM, and I -- so, I guess my questions are while transmission inter-connection is useful in contingency planning, do you agree that we still need additional generating resources to provide adequate power?

*Mr. Bresler. No question we need the right mix of those two components, absolutely. We need sufficient resources to meet the demand that is going to be on the system in all hours -- not just at the peak, but at all hours, and transmission, you can't get it to load without transmission, right?

*Mr. Guthrie. Mm-hmm.

*Mr. Bresler. And I think the key to knowing what transmission to build and where is applying the right analytics to make sure that the transmission that is being

built is necessary and also cost beneficial for consumers.

*Mr. Guthrie. Can you do it with just solar and wind/

*Mr. Bresler. To Mr. van Welie's answer earlier, not now for sure.

*Mr. Guthrie. All right.

*Mr. Bresler. To the extent that we had sufficient quantities, and sufficient quantities of longer term storage, the answer could get to maybe, but not right now.

*Mr. Guthrie. So, to what extent is PJM building redundancies to plan for contingency operations versus relying on neighboring systems? So, what is your contingency plans?

*Mr. Bresler. Well, we constantly plan with a reserve margin in mind. So, when we procure resources to meet demand at all hours, we do so with a reserve margin target. And as I said earlier, right now, we exceed that reserve margin target due to the -- again, the investment that the markets have attracted in the PJM region. And then we plan transmission to make sure that those resources on the system can be delivered reliably to the load, again, in all conditions, peak hour and otherwise.

So, it's the combination of making sure there's sufficient resources and then planning for transmission to get it to the demand, and part of that planning process of the transmission system relies on interregional coordination. We've been doing interregional planning coordination since before I joined PJM, which was a long time ago, and we continue through the agreements that you reference, the joint operating agreements, the joint reliability coordination agreements we have, to coordinate those planning efforts to ensure that transmission planning works together interregionally, and will support interregional transfers.

*Mr. Guthrie. Which is smart to do, absolutely, but sometimes you have a regional -- a cross-regional crisis like we had with the cold weather and then you're not adequate to supply energy. I know -- I think we were here until Christmas Eve, maybe, I think getting home Christmas Eve and there's no power in the house because -- and it was just shut down because of the adequate -- inadequate supply.

So -- and then Mr. Ramey, I might ask you to comment on this. Ultimately, I believe there is a resource adequacy issues, obviously not a transmission issue. Can you speak to

the importance on the focus of resource adequacy in your neighboring -- your system and the neighboring systems? You sort of did that. Let Mr. Ramey go ahead and move forward. Yeah.

*Mr. Ramey. It's the same story. It's the same story we've been talking about. We need to make sure that as we're retiring resources from the system, we think about the reliability attributes that are going away with those retiring units, and compare those to the attributes we're seeing with the resources that are being added to the system to make sure that from a planning perspective, planning for reliability in the future, you have new resources bringing the attributes you need to ensure reliability going forward. In our region, a little different than PJM that is announced at the -- on the current trend they're on, they'll be at minimum playing reserve margins by the end of the decade. My ISO has already reached that point.

We've already reached minimum planning reserve margins. We have been working closely with our stakeholders and they recognize the issue and the challenge and they've taken steps recently retiring, deferring, or deferring some retirements

that they had planned to make sure that the capacity is available in the near term to meet reliability requirements. But we do need a better focus to ensure that we can maintain that in the longer term.

*Mr. Guthrie. Thank you. My time has expired, and I yield back.

*Mr. Duncan. I thank the gentleman, and I will now go to Ms. Matsui for five minutes.

*Ms. Matsui. Thank you very much, Mr. Chairman, for holding this hearing today, and I want to thank the witnesses for joining us. We all agree that the reliability of our electric grid is our highest priority. Americans depend on electricity for our livelihood, our comfort and well-being, safety, and sometimes our lives.

In Sacramento and across California, we are pioneering new technologies that will provide reliable one hundred percent clean electricity, and I want to thank particularly Mr. Millar from California for being here today.

The overwhelming majority of power outages are due to weather related events. As climate change causes more severe weather, power outages have increased 67 percent since 2000.

Mr. Millar, last year CAISO joined Climate Ready, a research initiative to help grid operators prepare for the increasing frequency of severe weather. Yes or no, is it important for grid operators to consider the weather impacts of climate change in planning for future reliability needs?

*Mr. Millar. I thank you. Yes, I'd say it's important both for the independent system operators as well as for our utilities.

*Ms. Matsui. Mm-hmm.

*Mr. Millar. Many of the activities under the initiative you mentioned are also focused on what the utilities have to do to better harden and prepare their own equipment for these events, but we also have to sharpen our practices around forecasting and managing a diverse resource fleet to provide reliability as we have to face the broader brunt of climate change related extremes.

*Ms. Matsui. Right, good. CAISO recently announced a plan to create an extended, day ahead, wholesale energy market for members of the Western Energy Imbalance market.

*Mr. Millar. Mm-hmm.

*Ms. Matsui. This allows utilities to cross eleven

western states to plan ahead and ensure they have adequate energy to meet demand. Mr. Millar, does increased access to interregional generation assets make California's grid more reliable or less reliable?

*Mr. Millar. Yes. The access definitely improves reliability for all participants. While the original western energy and balance market and now our extended day ahead market --

*Ms. Matsui. Mm-hmm.

*Mr. Millar. -- were primarily focused on economic benefits of capturing the diversity and access to broader resources. They also provide a great deal of benefit in being able under stressed conditions to find every last megawatt and get it to where it needs to be when you're in -- when your systems are being stressed.

*Ms. Matsui. Okay, fine. The Sustainable Energy and Environment Coalition in which I co-chair has a transmission and permitting reform proposal, the SEDA Act, that would direct for to develop an interregional planning process requiring RTOs and ISOs to submit plans to expand interregional transmission capacity. Mr. Millar, would a

more formalized interregional planning process that expands interregional transmission capacity likely to make the grid more reliable, or less reliable?

*Mr. Millar. We do see the need for improved coordination well for quarter 1,000 and the regional transmission planning changes have brought into effect were very beneficial. The interregional transmission planning has definitely been struggling, and that scenario where we see additional coordination being required.

*Ms. Matsui. Okay. The SMUD, municipal utility district -- the Sacramento Municipal Utility District, I'm sure you're familiar with, has set an ambitious goal to be zero carbon by 2030. To get there, SMUD would draw on a range of flexible distributed energy resources, including managed charging of school busses, and smart thermostats.

In the 2022/2023 CAISO transmission plan, you consider how demand response and other non-transmission alternatives impact transmission planning. Mr. Millar, just a yes or no, does demand response have the potential to reduce the need for new transmission capacity?

*Mr. Millar. Yes, it does.

*Ms. Matsui. Have demand response and other non-transmission resources played a significant role in ensuring the reliability of the grid, yes or no?

*Mr. Millar. Yes, and we think they can play a larger role going forward.

*Ms. Matsui. Great. From a reliability perspective, can these resources potentially provide an alternative to traditional fossil fuel peak plants in the future?

*Mr. Millar. They can provide assistance on the capacity requirements at very high peak load periods, yes they can.

*Ms. Matsui. Okay, great. I wanted to ask you one more question. I don't have much time. About electric vehicles and the grid. New bidirectional charging technology for EVs can provide an opportunity to use EVs as grid storage. Cars are parked 95 percent of the time, and can act as mobile batteries, sharing electricity with buildings and the grid. How is CAISO planning for the potential of bidirectional charging, and I ran out of time. Please, I'm going to submit this question, if you would allow it. Thank you very much, and I yield back.

*Mr. Duncan. The gentlelady yields back. I'll now go to another leader on energy and the chair of the environment subcommittee, Mr. Johnson, thank you for filling in for me. You're recognized for five minutes.

*Mr. Johnson. Thank you, Mr. Chairman. Mr. Bresler, let me go straight to you. And thanks for being here today. My constituents in Ohio rely on what you and the PJM team do every day, and we're grateful for that.

You know, just two weeks ago in this subcommittee, I kid you not, I couldn't get the head of the FERC's electric reliability office to give me a straight answer as to whether his colleagues at the EPA ever call them or consulted with them to discuss electric grid reliability. Clearly, there's a lot of confusion on whether experts and stakeholders inside and outside of government are being consulted as they should be before the EPA promulgates its rules.

So, can you describe how many interactions you've had with EPA in the run up to this clean power plan 2.0, or EGU strategy, this sweep of rulemakings?

*Mr. Bresler. Yeah, I can't give you a specific number of meetings or conversations, but we -- there was some level

of interaction, some level of input that we provided, but the EPA is obviously under no obligation to take that input into account necessarily when they issue their final ruling.

*Mr. Johnson. Okay. Do you believe the EPA should consult more directly with grid operators and other electric sector authorities so it doesn't implement rules that will have a severe reliability impact?

*Mr. Bresler. I absolutely do, and we think that the rules should incorporate things such as reliability analysis into things like deadlines, as well as the potential for reliability safety valves as well.

*Mr. Johnson. Okay. All right, well, it's key that we get some clarity on all of this. I'm working on some legislation that would require the EPA to show their work and how they're doing this collaborative consulting process. And continuing with you, Mr. Bresler, I'm -- I got the February PJM report right here.

I know you've seen it, and it says, I quote, "it is possible that the current pace of new entry would be insufficient to keep up with expected retirements and demand growth by 2030,'' and quote, "thermal generators are retiring

at a rapid pace due to government and private sector policies.'' I have another report here that shows some nearly 4,400 megawatts of dispatchable power has been retired from PJM's portfolio just since Christmas of this year.

So from this report, the issue we're facing is that we're removing too much baseload dispatchable generation from the grid too quickly without adequate replacement. And I know this is a redundant question, but do you agree with that?

*Mr. Bresler. I do agree with that. I do agree there's the risk of that occurring. That report you're referring to that we issued in February is forward looking.

*Mr. Johnson. Yeah.

*Mr. Bresler. It's anticipating retirements based on the rules that are out there or that we expect to be put in place.

*Mr. Johnson. Okay, because in June when I hosted a subcommittee hearing on these EPA rules and I asked Patty Laughlin (phonetic), who does a great job as CEO of Buckeye Power in my home state, by the way, if my constituents can expect better or worse grid reliability a decade from now if

these rules go into effect. He warned that we're in a vary precarious position right now if we don't reverse course.

Now, many of you know we had a grid emergency this past Christmas Eve, and Buckeye Power, for example, had to run its coal plants at full capacity to narrowly avoid blackouts in our region and thank goodness for that, but here's the problem.

Since then, we've had eight power generating units shut down on the PJM grid, I just mentioned that, just since last Christmas. The 4,400 megawatts of capacity gone. So, Mr. Bresler, if we get a coal front, like we are likely to, could very well happen again this year, in the Midwest, can you assure my constituents that they will have electricity in their homes to run their furnaces this Christmas Eve?

*Mr. Bresler. Well, recall part of the issue that we had in Winter Storm Elliot was the poor performance of some generators on the PJM system for various reasons. So, we are working very hard to correct those issues and evolve so that those issues don't occur again. If we can get those issues corrected, yes, we should be reliable in the near future. Again, it's the end of the decade we're concerned about.

*Mr. Johnson. Okay. I've got some additional questions, but I'm almost out of time. Mr. Millar, I'm going to submit those for you. I'm really concerned that your written testimony failed to mention the emergency orders where you had to urge Californians to use less energy, stop charging their electric vehicles, throttle the thermostats, basically lower their standard of living. And so, I have some questions for you, but I'll submit those for the record. If you could get back to me, please. I yield back, Mr. Chairman.

*Mr. Duncan. The gentleman yields back. I'll now go to Mr. Tonko from New York for five minutes.

*The Clerk. Ms. Kuster has his schedule here.

*Mr. Duncan. Okay. Well, we'll recognize Ms. Kuster and come back to you. Ms. Kuster is recognized for five minutes.

*Ms. Kuster. Thank you, Mr. Chairman, and thank you Mr. Tonko, I'm very grateful. Mr. van Welie, I'd like to spend my time asking you three questions, but I want to move this along. As you know, ISO New England is the system operator for New England Electricity System, so your decisions will

have an impact -- a direct impact on my district in New Hampshire.

The sad reality is that New England faces some of the highest electricity rates in the country, and this is a consequence of the region's overreliance on natural gas. According to ISO New England's independent market monitor, energy prices in New England are driven by the price of natural gas, and when natural gas prices go up, so too do our electricity bills, and I'm worried about how decisions at ISO New England may exacerbate the problem. New England's electricity consumers are in the process of paying down a $535 million subsidy to keep the gas fire power plant at Mystic Station online.

Now, I'm glad that ISO New England aspires to be fuel neutral, and that this subsidy will come to an end in May of 2024, but the ISO has a track record of market rules and actions that leads to an over reliance on expensive gas fired power plants. My question to Mr. van Welie, what is the one change to ISO New England's market rules or structure that will stop propping up expensive natural gas generation and facilitate a more affordable generation mix?

*Mr. van Welie. Well, I'd first say that the quickest way to solve the pricing problem in New England is to build them pipelines to New England, and/or enter into long term contracts for LNG because we were stuck being dependent on gas for quite a long time. So, that's my advice in the short to medium term.

Obviously with regard to the policy imperatives to get off natural gas, I think the most efficient way to do that is to put a carbon price into the market, a real carbon price, because that will drive innovation and it will gradually allow us to wean ourselves off natural gas.

*Ms. Kuster. And while I'm concerned about our system's overreliance on natural gas, I'm excited about the development of solar in our region. New England has more than 7.5 gigawatts of installed solar, and most of this generation is residential. Can you describe how distributed solar resources drive down the cost of electricity by reducing peak demand while improving reliability?

*Mr. van Welie. Yeah, so, solar is a helpful resource, and it's one of the reasons why I was able to say earlier on in my testimony that for the resource mix that we know we

will have in 2027, if we add solar to that mix when it does produce, even in the winter time, it's allowing us to display some of the use of stored fuels.

But there's a caveat. So, the reason solar is coming on so strongly in New England is that it's getting a lot of out of market revenue via state incentives and some federal incentives, and the point -- the other point I made in my testimony is that to the extent that policy ends up sending revenues to one resource set and not another, you create an economic distortion in the marketplace. The consequence of that --

*Ms. Kuster. Don't we have that right now with the subsidies to oil and gas? And when you talk about a pipeline, that would be significant subsidies?

*Mr. van Welie. So, that -- yeah, that certainly is historically correct, so I mean, I'm looking at this from the perspective of the resource mix that you have and paying for what you have going forward. My concern is that all the modeling we've done shows that the addition of more and more renewables is going to drive revenues in the energy market down, which is going to call into question how do you

maintain the fleet of resources that are going to balance these renewables?

And so, the caveat here really is that we're going to become more and more dependent on increased revenues in the capacity market, and if we can't make that capacity market work properly, then we will end up unwinding and having to unwind the market. And so I think that's the biggest risk I see going forward.

*Ms. Kuster. Thank you. I think it's important to note cost saving solar resources are a byproduct of individual Americans taking the initiative on their own to install solar generation. Consumers want clean energy. The Inflation Reduction Act will turbocharge those investments in residential solar and lead to new investments in utility scale and wind across New England. These projects will help lower the cost for our taxpayer -- our ratepayers.

We also need clean, dispatchable resources like hydropower that can complement renewables and ensure reliability. And my question for you, can you speak to how domestic hydropower and hydropower imports improve reliability and will lower costs for Granite Staters?

*Mr. van Welie. So, hydropower is an important element in the resource mix. Adding additional output from hydropower would obviously be helpful, because it gets us a hedge against burning more fossil fuels, or the supply chain risks that I mentioned earlier on, but it comes with a cost as well. So, somebody has to invest in that.

*Ms. Kuster. Thank you. My time is up, but I do want to include for the record a question about how we can stop electricity customers from having to subsidize the Everett Marine Station. Thank you. I yield back.

*Mr. Duncan. The gentlelady yields back. We now recognize Dr. Bucshon of Indiana for his five minutes of questioning -- five minutes of questioning.

*Mr. Bucshon. Thank you, Mr. Chairman, and thanks to our witnesses, and thanks for the openness and honesty. It's really, really important in this space today, and in the future. My -- I do find it fascinating that my colleagues -- some of my colleagues are now talking about fossil fuel -- not you all, but my colleagues -- about fossil fuel infrastructure reliability is a reason why we may have blackouts and brownouts. That's fascinating to me.

Then we maybe should start improvements instead of shutting them all down and banning new pipelines and other things that we're trying to ban as it relates to the fossil fuel industry. And I do hope the American people is listening to this hearing, because it's that important. Let me read between the lines to the testimony, and I'm not speaking for anyone. I'm just reading between the lines here.

An all of the above source approach is necessary, and the energy policies of the Biden Administration and their allies won't work and doesn't work. So, we know that regional transmission organizations have incredibly critical jobs and often very difficult jobs. It's very difficult. RTOs must answer to multiple stakeholders while not only regulating -- regulated by FERC, RTOs are also member driven organizations tasked with implementing policy directives from states and asked to continue to preserve reliability all while the federal environmental policies push critical -- push critical, dispatchable generating capacity into premature retirement.

RTOs are at the confluence of these tensions. Mr.

Ramey's testimony highlighted these tensions and the uncertainty it casts over MISO, which covers the area that I represent. The notion that RTOs are independent "pure markets matching supply and demand at the least cost'' is continuously challenged.

I do want to commend several RTOs, particularly MISO, which is headquartered in my state and operates as I mentioned over my Congressional district. For recognizing critical flaws in EPA's recent proposed rule under section 111 of the Clean Air Act. MISO did not mince words in their public comments when saying that the proposed rule would, and I quote, have the potential to materially and adversely impact an electrical reliability, and when combined with other EPA rules and other policy actions could well exacerbate the disturbing trend and growing risk wherein the pace of retirements of generation with attributes needed to ensure grid reliability is rapidly exceeding the commercialization of new resources capable of providing those reliability attributes.

It seems clear to me that a finalized EPA's proposal rule will put numerous additional pressures on this already

strained process. I understand that MISO has paused all new interconnection requests for the rest of the year because of a significant backlog. I'm sure you're aware of the difficulty this creates for utilities and in the long term planning and the snowball effect that such uncertainty has for industry markets and grid reliability. So, Mr. Ramey, could you briefly describe any accommodations MISO was able to make for utilities during this pause on generation interconnection requests?

*Mr. Ramey. Yes, sir. Thank you for the question. It is true that earlier this year we paused our annual process of accepting new requests for inter-connection. To put that in a little context, our current active queue is about 242 gigawatts of requests. We have a long history of working to work through the challenges and issues of getting answers to the questions with a -- with an inter-connection queue that large.

To put that 242 gigawatts in some context, MISO's annual peak load is about 125 gigawatts. So, a lot of requests to connect to the system, but I do want to point out that over recent years, we've approved 50 gigawatts of interconnection

queue requests that have signed inter-connection agreements. The average delay of moving those approved projects forward is approaching two years.

Supply chain issues, slowdowns, and getting regulatory approvals for example. So, while it is true that we are working through a large queue, we have a lot of approvals out there already that are struggling to come online.

*Mr. Bucshon. Great. Thank you. In your testimony you said, and I quote, "over the last decade, excess and underutilized capacity was slowly removed from the system, almost always in the form of traditional controllable resources, and there has been an accelerating trend for new weather dependent energy resources while installed generation capacity is expected to increase by 117 percent, almost all wind and solar'', what you call, and I quote, a "credited capacity,'' is going to increase by only 22 percent.

I'm an all-of-the-above believer. I think we need all of these things. I believe in innovation across the energy space. I very much appreciate all your testimony, and I'm out of time and I yield back Mr. Chairman.

*Mr. Curtis. Thank you. The gentleman yields. The

Chair recognizes the ranking member of the full committee, the gentleman from New Jersey, Mr. Pallone.

*Mr. Pallone. Thank you. I just wanted to start out by acknowledging the terrible grid outages that hundreds of thousands of people suffered last winter in the southeast as Winter Storm Elliot ripped through the region. So my question, Mr. Bresler, if I could start out with you, is PJM is the grid operator for my home state of New Jersey. Can you describe how the wholesale power market you run helped keep the lights on during Winter Storm Elliot, and how did the PJM support TVA and DUP (phonetic) territories even as they suffered rolling blackouts?

*Mr. Bresler. Thank you, Ranking Member Pallone. It's a pleasure to be here today. The wholesale market operates to ensure that the physical asset owners and operators in our region are partners with the op -- with the grid operator in maintaining reliability, and it does that by providing the right financial incentives for performance of resources to make sure their resources have that financial incentive to act in a way that reinforces grid reliability. And then to the extent that we are able to and we have the energy

available to us to do so, we are able to export energy to other areas like the southeast in the instances like Winter Storm Elliot to provide assistance when that's possible.

*Mr. Pallone. So, there were nearly a hundred gigawatts of generation that were forced offline during Winter Storm Elliot, and nearly two thirds of that lost generation was from natural gas plants, and I'm frankly concerned that we've heard so much from Republicans about reliability issues from renewable sources of energy when we've had several events in the last few years that have shown us that natural gas infrastructure has serious reliability issues.

So, since 2005, we have an entity to create mandatory reliability standards for the bulk power system, but the bulk power system relies heavily on the natural gas sector. So, Mr. Bresler, again, are you aware of any federal mandatory reliability standards for the natural gas system as FERC Chair Philips has called for?

*Mr. Bresler. I have not.

*Mr. Pallone. Okay. Mr. van Welie, I know you mentioned this in your testimony. Did you want to add anything to that or say anything about it?

*Mr. van Welie. Sorry, could you please restate the question?

*Mr. Pallone. Yeah. In other words what I'm concerned about is that I'm trying to find out if any of you are aware of any federal mandatory reliability standards for the natural gas system.

*Mr. van Welie. Right.

*Mr. Pallone. FERC Chair Philips has called for that.

*Mr. van Welie. No. So, I mean I said this in my opening testimony. I think it's imperative that we have better oversight of the reliability of the gas system, because I think we should stop thinking about these systems as independent of each other. They're totally interdependent, and what impacts the one system will impact the other.

So, I think -- I sort of find it ironic that we've got all of this oversight over the electric system as a result of the 2003 blackout, but the biggest single source of energy to the electric system doesn't have comparable oversight. So, I would urge the committee to consider that.

*Mr. Pallone. I appreciate that. And you know, last

year, committee Democrats held a hearing on a proposal to create mandatory reliability standards for natural gas infrastructure, and I think it was well received and we got some excellent feedback on how to improve gas reliability, but given that lack of reliability, I also wanted to touch on an aspect of PJM's capacity market, which is the market mechanism that the mid-Atlantic grid uses to ensure resource adequacy in the future, and my understanding is that PJM is considering making significant changes to its capacity markets going forward.

So, I'm going to go back to Mr. Bresler again. Could you talk about the changes PJM is considering making, especially as to how it accounts for the reliability of natural gas fire capacity during the winter, and how these changes might bolster PJM's grid reliability, if you would?

*Mr. Bresler. Yeah, thank you. Probably two primary areas I'll highlight in the changes we intend to file with FERC in a couple of weeks. One is resource accreditation. So, ensuring that resources are assigned a reliability value that they can actually provide to the system.

And so, natural gas resources that have less ability to

perform when the system is most stressed would receive lower resource accreditation, lower capacity accreditation as a result. And then secondly, maintaining the incentives for resource performance.

So, ensuring that there is significant consequence for a resource that takes on a capacity obligation, is compensated for that capacity obligation, but then does not perform in real time when it's needed to perform, and those consequences will provide the incentive for those resources to do what's necessary to be able to provide megawatts when they are needed. Those are the two I would highlight.

*Mr. Pallone. I appreciate that, and you know, I just want to note that in some of the testimony today, federal clean air standards have been criticized as leading to future power plant retirements, and I want to push back on that, because rules under the Clean Air Act clearly require EPA to choose systems of emission reduction that are adequately demonstrated at a reasonable cost, and EPA has done just that. So, thank you Mr. Chairman.

*Mr. Curtis. Thank you. The gentleman yields, and the chair recognizes my colleagues, the gentleman, Mr. Walberg

from Michigan.

*Mr. Walberg. Thank you, Mr. Chair, and thanks to the panel for being here in this extended period of time. Mr. Bresler, I'm pleased that I now have PJM in my new district. A small portion of it, but nonetheless you're there and I appreciate that.

You issued a report earlier this year warning that you face significant capacity shortfall by the end of the decade due to several factors including EPA rule makings. The GHG rule in May that was submitted, and the new proposed regulations put onerous requirements on both gas and coal fired generation which I understand make up over half of your generation mix. Do these regulations worsen PJM's potential capacity shortfall, and can you elaborate on how even proposed regulations, not just finalized regulations, have an impact on utility planning for power generation?

*Mr. Bresler. Sure. Certainly. So, the first part of your question, they could exacerbate the potential for reliability problems in the future to the extent that, again, we don't get sufficient replacement resources to maintain overall resource adequacy and get the types of generator

attributes that we need, reliability attributes that we need in order to replace what could retire. So, the -- to the extent that those rules cause more retirements of those that are providing those services, we would run into those types of reliability issues.

Proposed rule versus final rule, I would say that the impact that could have is the chilling impact on investment. So, the market price signals will demonstrate what is necessary for reliability, both overall and on a locational basis, but we rely on investors, to Mr. Dewey's point earlier, and that's where the risk lies with building a new generation, and to the extent that there is an environment that is contrary to an investment thesis, I'm concerned we won't see the investment we need in resourced to maintain reliability.

*Mr. Walberg. Yeah, the same impact the fed making a statement. It can color the whole mix. Thank you. Mr. Ramey, can you talk about how supply chain problems and permitting delays -- and I'm delighted to say that we've some bipartisan agreement on the need for permitting reform, but how those supply chain and permitting delays are impacting

reliability. And secondly, how many megawatts do you estimate are tied up over these two issues?

*Mr. Ramey. In terms of how many megawatts? I mentioned earlier we have 50 gigawatts of resources of approved requests to interconnect to our system. On average, they're running about two years behind schedule. The owners of those assets and the developers that are bringing those online communicate to us what the drivers are of the delays, and that over 60 percent of the response we get point to supply chain slowdowns, the slow down in their ability to get the equipment they need to bring those units online and regulatory approval. So, it's information we receive working with our members who are trying to interconnect those new resources.

*Mr. Walberg. Now, we've heard -- we've heard about 50 megawatts are impacted by supply chain and permitting. Is that --

*Mr. Ramey. 50 gigawatts. 50,000 megawatts.

*Mr. Walberg. 50,000 megawatts, yeah.

*Mr. Ramey. Yes.

*Mr. Walberg. Okay, okay. We've heard from

stakeholders that the ISO has done a good job of planning a transmission build out to maintain reliability. I'm heartened to even see some of that -- of that build out and transmission projects in my district. But how does MISO balance planned transmission investment with sending signals for generation investment, and secondly, what is MISO's plan to accelerate the progress incentivizing reliability focus generation investment commensurate with the rapid development of transmission capabilities?

*Mr. Ramey. As part of our responsibility as a coordinator of regional transmission planning, we look at an objective function, which is focused on minimizing the total cost of investment to serve load reliably in the future. So, when we're looking at a transmission build out, we are considering the implications of future transmission elements and how that affects the locational generation on the system. So, that's our approach to try to minimize the cost and coordinate the generation transmission planning within the region to achieve reliability at a low cost.

*Mr. Walberg. Well, I see my time is about up, so thank you, and Mr. Chairman, I yield back.

*Mr. Curtis. Thank you. The gentleman yields. The chair recognizes the gentleman from New York, Mr. Tonko.

*Mr. Tonko. Thank you, Mr. Chair, and thank you to all of our witnesses. I especially want to offer a shout out to Mr. Rich Dewey who provides a great service for the state of New York. Thank you for your sound leadership, Mr. Dewey, and thank you for transitioning us into a new era. So, we appreciate it, and I appreciate that we're in a time of incredible change in our electricity system. We can certainly acknowledge that there will be challenges, but we I hope will embrace a can do attitude and seek to overcome them, because I believe there is ample evidence that a well-planned cleaner grid will have significant consumer benefits including that of reliability.

Earlier this year, Americans for a Clean Energy Grid released a transmission planning and development regional report card. They found that across all regions there is room for improvement, which could largely be achieved by better proactive planning for the future resource mix. So, Mr. Dewey, you are operating in New York that has enacted ambitious long term public policy goals. Can you discuss how

those goals have changed how you carry out your transmission planning efforts?

*Mr. Dewey. Sure, Congressman, and thank you for that introduction. A couple of things that we have done to our planning processes to accommodate and respond to New York State's aggressive climate goals is two-fold. One is we've significantly extended the horizon by which we look into the future to try to identify where reliability needs might exist, and where opportunities for investment might exist. So, that planning horizon is now a 20-year horizon in recognition of the long range goals that New York has established, and it gives us the benefit of more certainty of what the objectives are.

We do approach this from a can-do attitude, and we do try to identify the pathway and the needs and the requirements that it would take to be successful. In that way, we try to identify the magnitude of the investment that we're going to need, we try to identify the locality of where the optimal location for that investment is, and that helps policy makers understand what the future costs might be, and what a reasonable timeline might be.

*Mr. Tonko. Thank you. Now, Mr. Ramey, I know that Mr. Peters asked you about MISO's long range transmission planning projects, and I also know that MISO has successfully done big planning processes in the past with the MVP process. Have you found that transmission planning over a larger area, even within a single region, can simultaneously support renewable deployment, enhanced reliability, and lower consumer costs?

*Mr. Ramey. Absolutely. Those are all value drivers of the transmission we've been successful in having built over the past decade, and we look at those value drivers as we're considering future transmissions through our long range transmission planning process that's currently underway.

*Mr. Tonko. Thank you, and I recently met with a company that is installing dynamic line rating systems in my Congressional district. This project will reduce renewable curtailments while avoiding the need to rebuild 26 miles of transmission lines for a fraction of the cost. So, Mr. Dewey, how should these types of grid enhancing technologies be incorporated into our planning and management of the electric system, and are these low cost and quick solutions

given proper consideration?

*Mr. Dewey. I think they are, and in many respects they're already in use in New York. We work with our local transmission owners to update line ratings on a frequent basis based on system conditions based on forecast loads and temperature expectations.

I think there's opportunity to do that on a more frequent basis through automation and we're exploring that with all the transmission owners in the facility and owners within New York State right now. I think that there is tremendous opportunity to get more efficiency out of our existing infrastructure if we make that investment of both time and money.

*Mr. Tonko. Thank you, and also to Mr. Dewey, I also know that RTOs are working through FERC's recent interconnection rule. Can you discuss what efforts you already had underway to improve the interconnection process, and how it aligns with the final FERC order?

*Mr. Dewey. Sure. We've been working on interconnection reform for over a year with our stakeholders. We recognized the tremendous volume increase we've seen

almost tenfold in New York in terms of the number of projects that are in our interconnection queue, and we recognized the need to be able to be more efficient at that, and we need to do so without compromising reliability as I indicated in my opening comments.

FERC order 2023 has some attributes that are very consistent with what was already in place in New York, specifically the cluster studies and the ability to get to a more definitive cost estimate for necessary upgrades by looking at all the projects together. So in many respects, we've been there in New York, and it's just a matter of looking at the specific time lines and making sure we can meet the expectations of this FERC order and comply with the rules.

*Mr. Tonko. No, I appreciate that, and I believe it's worth holding hearings, Mr. Chair, specifically examining how Congress can support the states, grid operators, utilities, and other stakeholders to adequately plan for and meet transmission needs to address our changing electricity mix, and with that, I yield back, and thank you.

*Mr. Curtis. Thank you. The gentleman yields back.

The chair recognizes the gentleman from Virginia, Mr. Griffith.

*Mr. Griffith. Thank you very much, MR. Chairman, and I know it's not you all's area but I just finished chairing a hearing on the Maui wildfires and the electric situation there. And so I would just say that when you all are in conversations, public safety power shut offs, whatever you all can do to encourage the utilities to put in safety measures to try to avoid -- and we're not saying that it was all caused by -- the investigation goes on, but clearly there was some role played by the electric utility there. So, anything you all can do to encourage the utilities to do safety. I know it's not your turf, but it's what I've been doing all morning, and I apologize I wasn't here because this is a very important hearing also.

Mr. Bresler, I think you have most if not all of my questions. I have a few maybe TVA folks down in the deep, deep southwest part of my district, but your regional transmission organization, PJM, which serves most of my folks, and much of the mid-Atlantic including the ranking member of the full committee and others, and a large portion

of Appalachia.

As we go through the process and more and more dispatchable generation plants are retired, what are the timeline projections for replacing the power from these existing fossil fuel facilities?

*Mr. Bresler. Well, that's the $64,000 question, sir.

*Mr. Griffith. Yeah, that's why I asked.

*Mr. Bresler. If you look at the -- if you look at the written testimony we submitted for the record, there's a lot that goes into that type of evaluation because there's a lot of uncertainties, right?

And so in a case where there is a low level of replacement generation that actually come on in the system, and the retirements are as significant as we think they could be, we could start recognizing some shortages as early as 2027 or 2028. If we see a high level of replacement generation come online despite the potential for, you know, retirements we see coming, you know, we could be reliable all the way through 2030 and beyond.

So really it all depends on how much of that generation that is in our queue -- we have a queue that's almost the

same size as MISO's, as Mr. Ramey had said earlier. It all depends on how much of that actually comes in service in a relatively expedient fashion.

*Mr. Griffith. All right. Looking at the chart in your testimony on the policies that are causing power plants to shut down, barring some big change, what is the tipping point, and when do we get to a point where we're not reliable, and I think I just heard you say 2027, but you -- can you expand on that?

*Mr. Ramey. Well, it could be that early.

*Mr. Griffith. It could be.

*Mr. Ramey. It could be that early if, again, the pace at which replacement generation comes online does not accelerate.

*Mr. Griffith. Now, when you say that it could be as early as 2027, what about when we have significant weather conditions like we had before Christmas where we got down the three degrees and probably lower than that in some parts of my district, but where I live it got down to about three degrees, and I'm in the warmer part of my district. Would that accelerate that timeline?

*Mr. Ramey. Well, the analysis --

*Mr. Griffith. At least for temporary days, a few days?

*Mr. Ramey. The analysis takes into account --

*Mr. Griffith. It does.

*Mr. Ramey. -- reasonably expected, you know, extreme weather conditions that we would see in either the summer or the winter, and the winter has been more severe over the last decade plus, right? So, it does take into account that type of situation. Again, we're working in other areas to improve our system's response to those types of conditions such as gas electric coordination, you know, gas fire generator performance and those types of things as well.

*Mr. Griffith. Now, you all have taken -- somebody may have already asked this question, so I apologize, because I was doing the other hearing, but have you all taken into consideration the plans for all these electric vehicles? Is that a part of your analysis that at least the administration thinks we're going to have by 2030?

*Mr. Ramey. Yes, that is something that I actually highlighted in my opening comments.

*Mr. Griffith. Okay. Sorry I missed that.

*Mr. Ramey. No, that's -- I'm sorry, and also something that's baked into our load forecast to the best that we can anticipate. And so, we will continue to update those forecasts in either direction, depending on how things transpire, but based on our, you know, look out up to 15 years into the future, yes, we do bake that into our load forecast.

*Mr. Griffith. And Virginia specific right now at least the policy is, is that we're going to not sell anything but electric vehicles after 2035. Is that baked in also?

*Mr. Ramey. Yes, to the extent that we can go out that far. 2035 is pretty far out in the future.

*Mr. Griffith. Stretching it, right?

*Mr. Ramey. Yes.

*Mr. Griffith. All right, I appreciated that. I know you submitted comments on the proposed -- or, what your organization did on the proposed green rule -- greenhouse gas power plant rule. What were your interactions with the EPA like in the pre-rule making process?

*Mr. Ramey. We did have some offline discussions with EPA. They did reach out and request, you know, some

conversations with us, so we did provide some input along the way. But as I -- as I said earlier, the EPA is obviously under no obligation to take our input in finalizing a rule.

*Mr. Griffith. Did they seem concerned about grid reliability, or was that just one of those things they didn't care about?

*Mr. Ramey. Oh, I would certainly say they understood our concerns.

*Mr. Griffith. All right. I can't ask for any more from you for that. I understand it's a difficult situation. Mr. Chairman, I yield back.

*Mr. Curtis. Thank you. The gentleman yields and the chair recognizes the gentlewoman from Washington, Ms. Schrier.

*Ms. Schrier. Thank you, Mr. Chairman, and thank you Madame Ranking Member, and thank you to all of the RTO witnesses we have today. I really enjoyed listening to all of you, and also hearing the common themes that you all expressed today. The need to transform the energy grid to clean energy is clearer than ever.

In my district, climate change is already manifesting as

record breaking temperatures and drought causing triple effects across the region that severely increase wildfire risk, including now in the Olympic National Rainforest, droughts and risk to human and wildlife health, and while the addition of intermittent renewables as we've heard many times today onto the grid can pose additional reliability considerations, and I have been in the room seeing the fluctuations, we are fortunate to have hydropower as base power.

There are ways that we can smoothly transition. I know you're all working on this, and we need to move to an energy portfolio that dramatically cuts greenhouse gas emissions partly through a reliable grid, and the balancing that you all do.

Resource adequacy standards, automated energy markets, and transmission expansion are things that are essential to this, and the west has already put into place and we've heard about a resource adequacy program that many including Bonneville Power Administration have joined, and in addition bringing all of the west's utilities into an automated market improves efficiency and reliability and lowers cost for rate

payers.

Mr. Millar and Mr. Suskie, I have a question for you. I'd like to ask you each about your RTO's proposal for day ahead market in contrast to in real time. CAISO's EDM and SPP's markets, plus northwest utilities in my district including BPA are all evaluating both types of markets right now, and my understanding is that the governance structure is a key factor in deciding whether or not to join and how to manage an energy market, and I was wondering how you each take these interests into account as you develop your respective day ahead markets, and sir, you can go first.

*Mr. Millar. Sure, thank you. I'll start by mentioning that, yes, we do see the extended day ahead market moving into the -- the big advantage of moving into the day ahead market is to get resources properly dispatched to be most effective then when they get to real time.

So, we do see tremendous additional economic advantage to the participants to move to the extended day ahead market, and we have been moving forward with that tariff structure. I think you may have heard earlier today some concern already expressed about the governance structure of the ISO with our

board of governors being established through state processes, and that is a concern that some of our stakeholders have raised with us.

In the meantime though, because we really aren't in a position to do much about that, we have been supporting some of the other conversations about alternative structures that could provide the participants in the extended day ahead market more comfort about the -- how rules are developed to support the extended day ahead market going forward, and will be continuing to support those conversations.

*Ms. Schrier. Thank you. Mr. Suskie?

*Mr. Suskie. Yes, well, thank you. Yes, we do have 38 utilities in the western interconnect that have entered a contract with us to explore us providing the day ahead market that we call markets plus. A key component of that is our governance.

And so as a result, working with the stakeholders for about 11 months, we developed a governance structure that they had high input in, and they agreed to sign up to fund and pursue. And so, the way that our governance structure works, it's very much kind of a democracy type of approach.

It is every sector, every utility gets a vote on every policy that goes through. We create a weighting and balancing, and in the west, they agreed to a third goes to the investor owned, a third goes to the public power or co-ops, and the third two other entities, including NGOs that want to participate.

Once they reach a two-thirds consensus, it then goes to an independent board, and then for phase one, our independent board includes two people from the west, one from your state, John Caparo, Steve Wright, and Liz Moore who is actually from New York.

And so as a result we've had this process. It's great seeing them utilize this process, and the teamwork and the relationships that are built of how to work together. It's modeled on what we've done since 1941, and as an RTO we'll hit 20 years as an RTO next year, and we've grown from seven states to 14, and using this governance structure would consolidate its 17 balancing authorities into one. We have the lowest or close to the lowest wholesale prices in the country, and we set a record amount of renewable penetration meeting the state goals and requirements.

*Ms. Schrier. Thank you. That is very impressive, and I think you in that answer pretty much answered my next question which was about if day ahead markets were operating and at the same time, how do you balance this? And so, thank you very much. I am out of time. I yield back. Thank you.

*Mr. Curtis. Thank you. The gentlewoman yields. The Chair now recognizes himself for five minutes, and Mr. van Welie, I recently had a trip to Houston and sat in front of a businessman who laughed when he said he had a business that trucks natural gas to Long Island through Manhattan. He takes about 80 semi-truck per day to Manhattan to get natural gas to Long Island because of the refusal to build a pipeline ostensibly because of the greenhouse gas emission emitted from natural gas, yet we truck that in. Are we perhaps looking at this wrong?

*Mr. van Welie. Well, if your question is, do I wish I was off natural gas, the answer is yes. You know, we've looked at this problem for two decades and long, and -- but --

*Mr. Curtis. So, by the way, that wasn't my question.

*Mr. van Welie. Oh, wasn't it? Okay.

*Mr. Curtis. Yeah, are we looking at this wrong? The refusal to build a pipeline which would reduce greenhouse gas emissions, is that a bad decision?

*Mr. van Welie. Well, you know, I think it's no longer even a conversation in New England. So, you know, given where we're at, we're looking to decarbonize as quickly as possible.

*Mr. Curtis. I understand. We're paying for 80 semi-trucks per day to drive through Manhattan, and calling -- and feeling good about our climate perspective, and I'm -- if you don’t see that, I think the rest of the room sees the problem with that.

*Mr. van Welie. Well, the problem is when do you really start making the transition, because you can sort of --

*Mr. Curtis. So --

*Mr. van Welie. -- use logic to --

*Mr. Curtis. So, today --

*Mr. van Welie. Yeah.

*Mr. Curtis. -- they're burning natural gas in Long Island.

*Mr. van Welie. Right.

*Mr. Curtis. Today they're trucking that through Manhattan, and that feels good, right? Because we're lowering greenhouse gas emissions but we're not. So, obviously we're not going to see that eye to eye. I want to shift gears a little bit and talk about what I heard as a paradigm that I'd like to shift just a little bit, and that's this concept of reliability of renewables versus natural gas, and I think there's two ways.

The paradigm I want to shift is one perspective of reliability is the actual infrastructure itself, and the other is the actual inherent nature of the source. So, one of the reasons Republicans tend to point at renewables, which we don't hate, we love renewables, but as unreliable, is not the infrastructure but the source.

And so for instance I was in Scotland, and the president of Scottish Power bragged to me that he was a hundred percent renewable. I found that amazing, and so I asked him a little bit more, and he told me about the wind, and the offshore wind, and how they have such an excess of offshore wind.

And I didn't mean to capture him in any kind of a trap, but I asked him what do you do when the wind doesn't blow.

It was just a natural curiosity. He smiled and said we import natural gas from Russia.

Two minutes later, he told me he was a hundred percent renewable, and I just bring that up, because I want to point out the difference in reliability that I think Republicans talk about, that it's a mistake not to at least address that issue that currently renewables have a storage issue. I think that they'll overcome that, and I think they're moving very quickly to overcome that, but that's just a reality.

Mr. Bresler, would you like to comment on that?

*Mr. Bresler. Not necessarily. I mean, I understand what you're saying. It's hard to say you're a hundred percent renewable when you're burning natural gas, but --

*Mr. Curtis. Yeah.

*Mr. Bresler. -- I'm not sure what the basis for that claim was.

*Mr. Curtis. Yeah. Mr. Rickerson, I don't live in Texas. It's hard to find somebody from Texas that's not really proud of the fact that they live in Texas. And so I look at a distance at your grid, and don't fully understand it. Would you just take a minute to help those of us who are

not familiar with why you like your grid so much, and the kind of the closed nature of it, and maybe help us see some of the things that you would like us to see about that grid.

*Mr. Rickerson. Certainly. So, the ERCOT grid is not synchronously connected to the other grids in the country, so there's no alternating current lines connecting them. So, one of the advantages of that is that we are not under FERC jurisdiction.

So, when we see the need for a transmission line, we can see the need, go through the endorsement CCN process and have the line built in three to five years. So, that's one advantage. Another advantage has been the interconnection process for a new generation. We have a small generation interconnection process that has put a generation on the grid from the time we get the screening study to the power on the grid it's been seven months, and large generator are only restricted by how long it takes them to build the generation. And so, that flexibility, that ability to be agile and the ability to respond is one of the things that we like about the ERCOT grid.

*Mr. Curtis. Good. That was very succinct and right on

time and I'm out of time, so I yield, and the chair recognizes the gentlewoman from Florida, Ms. Castor.

*Ms. Castor. Thank you, Mr. Chairman, and thank you to our witnesses. I also was at the Maui wildfire hearing and I regret I haven't been here the entire time to hear your testimony, but I -- it is -- this is an important hearing, and we have to do more to modernize electric transmission across America.

I am concerned that it's become so overly partisan that sometimes the -- my Republican colleagues here, they just appear to be paranoid about the impact of renewables on reliability where they can bring enormous new reliable resources and we're relying on professionals like you to make sure that that happens. It's not like you can snap your fingers and make this happen, but we have got to move to cleaner energy that's less polluting and is lower cost over time.

So, I appreciate your work in doing that. I'd like to -- you know, the -- none of the GOP led bills really tackle the problem of interconnection queues or some of the other important investments in the infrastructure like we've done

in the bipartisan infrastructure law, in the Inflation Reduction Act.

I'd like to -- there's a new bill that is about to be filed, and I'd like to highlight it to everyone here, they're about to roll out the Clean Electricity and Transmission Acceleration Act. It's a consensus permitting reform package led by my colleagues, Congressman Sean Caston, who is an expert and has a background in power production, and Congressman Levin of California. It is aimed at speeding up grid interconnection and reforming transmission cost allocation. It includes a couple of my pieces of legislation that I've worked on with producers for many years, and hopefully we can -- we can get to that too.

Mr. Bresler, two month ago FERC finalized order 2023. We've talked -- a few of you have talked about it here today. It's meant to help clear those interconnection backlogs. Can you give us a quick summary about what you're doing to implement that new rule, and what are best practices you've adopted to get projects through the interconnection key?

*Mr. Bresler. Yeah. Thank you, Representative Castor. Ironically just before FERC issued 2023, we actually filed a

comprehensive interconnection reform package with FERC that we have worked with our stakeholders on for about two years, and I'm happy to say it was largely consistent with FERC's order 2023.

I think the primary change to our process is moving from a first in, first served, to a first ready, first served approach, and then, you know, just making the milestones and the financial commitments, the site control requirements all stronger through the process really to try to weed out more speculative projects early on in the process so they don't clog it up, as has potentially happened in the past. And so, I think -- again, that's largely consistent with FERC's order 2023.

*Ms. Castor. Mm-hmm.

*Mr. Bresler. We do have some issues that we need to work out with some differences, and some maybe differences in approach that we need to work out, but we'll do that through the FERC process, and we'll get there, and we've already started implementing our transition process to get to the new one already. So, we expect to get through that in the next year or two and move along from there.

*Ms. Castor. Great. Thank you. At the -- just a couple of months ago when we were going through -- it feels like déjà vu as we head towards it, and that's an unnecessary government shutdown, but there was a similar standoff over the debt ceiling, and at that time we -- some of us were advocating to address the interconnection queue problem as part of the permitting reform. They did include some permitting reform streamlining in that deal at the end of May, early June, that they're now working towards.

I'm curious if any of you -- I'm going to go down the line. Just, were any of you advocating at that time on the interconnection issue, just yes or no? That was permitting reform writ large. It was -- it was very narrowly tailored at the end, and there was a lot of discussion about interconnection queue and trying to get that reform included? Yes or no, were you --

*Mr. Ramey. I'm going to say yes. MISO has been in an interconnection queue reform process for many years. So, regulation or legislation to help us solve some of those problems would be welcome, but we're not waiting on that to try and continue to work to solve the problem ourselves.

*Mr. van Welie. So, we've been -- our actions have been to try and improve the interconnection queue process. We introduced clustering several years ago. That's helped.

*Ms. Castor. But just on the -- that -- the final legislative product that the -- that solved the --

*Mr. van Welie. Yeah, we didn't advocate directly on that.

*Ms. Castor. Okay.

*Mr. Suskie. Yeah. We do have limits to lobby, as non-profits. It's under our FERC requirements in order 2000 that we counsel like other RTOs, work to find ways to reduce the time it takes to get through the interconnection queue.

*Ms. Castor. Yes?

*Mr. Dewey. Being a single state ISO, we've been working at the state level to accelerate the siting and permitting rules, so we did not participate in -- directly in the federal rules.

*Mr. Bresler. Same answer as Mr. Ramey.

*Mr. Curtis. So, I'm sorry to interrupt, but the gentlewoman's time has expired.

*Ms. Castor. I apologize. I yield back.

*Mr. Curtis. Yeah, thank you. The Chair now recognizes the gentlewoman from Arizona, Ms. Lesko.

*Ms. Lesko. Thank you, Mr. Chair. This is a very important issue. Thank you to all of you for being here today. In my state of Arizona, and I represent the Pheonix area and some of the suburbs of Pheonix, we're rapidly growing.

We're adding and expanding microchip semi-conductor chip factories including the Taiwan semi-conducting manufacturing company which is located in my district. Lucid Motors, which manufactures electric vehicles, and many other businesses are flocking to Arizona quite frankly from California, and I'm told by our power generators we have sufficient energy capacity now, but in two to three years they may not have the firm capacity needed for our growing state.

The current administration is prioritizing intermittent energy sources like solar and wind over baseload energy sources like natural gas. I believe we need both, and I believe we need to continue to invest in new technologies. Second, the EPA and some radical environmentalists will simply not allow firm generation to be built.

The Wall Street investors in renewables reap rich financial rewards and benefits of being on the grid, but they don't share any of the responsibility of keeping the lights on.

In the area I think this committee must fix is the broken market system, the ISOs and RTOs have developed, which does not prioritize or incentivize grid reliability. Our renewable subsidies have so distorted the market that we are building renewable projects that would not be built without subsidies.

FERC Commissioner James Danly testified before this committee and said given the market failures that the commission's actions have facilitated, there will be in time a catastrophic reliability event if FERC continues to fail in its duty to ensure power price formation, that will be the inevitable result.

Both MISO and ISO New England have warned about upcoming scarcity, and PJM, the nation's largest wholesale market, and the one that serves Washington, DC has recently raised the alarm about impending shortfalls. Commissioner Danly also said in the midst of PJM's dire warnings, somehow the prices

and its procurement auction at a time of impending scarcity went down. This represents an abject and obvious market failure.

With price signals such as these, it will be impossible for the markets to attract the investment needed to ensure resource adequacy. Mr. Bresler, my first question is, the subsidies renewables receive allow them to bid into your market at prices below their costs. How have subsidies distorted price formation in PJM?

*Mr. Bresler. Certainly prices in the markets are lower than they would otherwise be without those resources offers. However, our first and foremost priority and responsibility is reliability, and we believe markets will continue to support reliability because when resources are necessary in order to maintain reliability in the future, despite the editions that we have seen on the system, to the extent that the resources that are coming on are accredited with the right reliability value, those markets will signal the need for additional resources, and will signal the need for investment.

*Ms. Lesko. Well, I hope you're right, and thanks for

working on that because obviously everybody wants affordable, reliable energy, and they want to keep the lights on, and I think that's why we're having this conversation today because we hear these alarms out there that we're not going to have the grid reliability that we need.

My next question is for Mr. Millar. Mr. Millar, I've heard repeatedly how inexpensive renewable energy is. The California Energy Commission in 2022 said 59 percent of the state's electricity came from renewables, and zero carbon sources in 2020. I'm curious if renewables are so inexpensive why are California electricity prices so high?

*Mr. Millar. Well, I think the -- there, the issue that you're looking at is a combination of what is the total delivered cost looking at the energy market itself, renewables are obviously coming in at very low prices given the low fuel or no fuel costs associated with them. We do not control retail rates, but overall retail rates are -- take into account all of the above issues, including energy costs, transmission, and distribution costs, and certainly California has also had to experience additional other costs that weren't energy related dealing with issues like wildfire

hardening and other activities that have also put a lot of stress on our utilities for additional reinforcement and hardening of facilities. But the ISO doesn't have a direct role in retail rates. Thank you.

*Ms. Lesko. Thank you. Mr. Bresler, firm, dispatchable generation, either natural gas, nuclear, or coal --

*Mr. Curtis. I'm sorry.

*Ms. Lesko. Oh, am I out of time?

*Mr. Curtis. We're going to -- we're going to move on.

*Ms. Lesko. Thank you.

*Mr. Curtis. All right, thank you. The Chair --

*Ms. Lesko. I yield back.

*Mr. Curtis. Yeah. The Chair now recognizes the gentleman from Maryland, Mr. Sarbanes.

*Mr. Sarbanes. Thanks very much, Mr. Chairman. I'm wearing my Maryland hat. Mr. Bresler, I'm particularly concerned as you might guess about the backlog of the renewable projects in the PJM interconnection queue which are waiting to be approved for connection to the grid. Can you remind me how many gigawatts of generation are currently in that queue, and how much of that would be classified as

renewable?

*Mr. Bresler. We have roughly 200,000 plus megawatts.

*Mr. Sarbanes. Mm-hmm.

*Mr. Bresler. So, 200 gigawatts-plus in the queue, and about 97 percent is renewable and batteries.

*Mr. Sarbanes. Okay. So, that 290 gigawatts, is that the latest unit?

*Mr. Bresler. 200 gigawatts-plus.

*Mr. Sarbanes. Good. Okay.

*Mr. Bresler. I don't know the exact number off the top of my head.

*Mr. Sarbanes. 200 gigawatts.

*Mr. Bresler. But it's over 200 gigawatts.

*Mr. Sarbanes. All right.

*Mr. Bresler. Right.

*Mr. Sarbanes. Because these are stalled, the mid-Atlantic region is missing out on an opportunity to bolster grid reliability by bringing these hundreds of gigawatts of whatever it might be of renewable power online. And I note that's significantly more energy than the 40 gigawatts that PJM has projected could be threatened by the retirement of

fossil based resources before 2030, and we've heard about the alarm that you've raised.

I'm not fully -- I'll just begin, I don't buy the alarm completely. I -- I'm trying to get to the bottom of it and understand it better, but I think the hand off, if you can get this transmission moving, and this queue moving, can be pretty smooth in terms of the diversity of the portfolio in terms of the power sources and so forth.

So, I'm resisting a little bit the alarm that you're raising around the 40 gigawatts, because I think the replacement opportunity is pretty significant there. As you've noted, you've paused accepting new applications in 2022 to the queue to revise the whole process, to address the backlog, and I understand that new process began in July. Before that reform, how long did it take a single project to go through the interconnection queue given all of the bottlenecks and so forth?

*Mr. Bresler. It varied based on the project, but it could take upwards of, you know, two, three, four years for a project to get through the gate.

*Mr. Sarbanes. Yeah, and what's the hope on what the

reform will do if you're going to this project ready approach?

*Mr. Bresler. You mean how much less -- how much less than that?

*Mr. Sarbanes. How much -- how much less time will it take in a range, if you get that in place?

*Mr. Bresler. Significantly less, two years or less to get through the queue.

*Mr. Sarbanes. Yeah. Let me turn to the state's specific energy goals and requirements, which are very reliant on decisions made by the regional electric grid operators. Maryland has you know has set a very aggressive goal of producing 8.5 gigawatts of power from offshore wind by 2031.

And unless PJM integrates this goal into your planning and decision making, it's possible that power generated offshore at wind turbines won't be able to connect to the grid on land where it is needed, so it's very dependent obviously on -- the potential of this is completely depending on the transmission piece of it.

There are many gigawatts of renewable energy generation

under development, particularly offshore wind projects along the northeast coast. What's being done on the transmission side to accommodate these large multi-billion dollar projects that will be coming online? When does PJM think the necessary transmission improvements will be available to accommodate those projects? I mean, presumably you're working all of these things into your -- into your mindset and your planning, so can you speak a little bit to that?

*Mr. Bresler. Sure. We did an offshore wind integration study as far back as 2020 that was more systemwide in nature. We also have worked specifically with this -- with New Jersey, for example, under the state agreement approach to plan for their offshore wind integration at their request, and I think that's worked very well. We're now onto phase two of that planning process. Certainly we would -- we would be in a position to do the same thing with Maryland should Maryland choose to engage in that state agreement approach --

*Mr. Sarbanes. Mm-hmm.

*Mr. Bresler. -- to planning for their offshore wind. So, yeah, it's all part of it, and I think we're making

excellent progress in that regard.

*Mr. Sarbanes. Well, I'd certainly encourage that kind of collaboration and factoring in the state's perspective, in this case, Maryland, as you're deploying your strategies here to get the backlog solved and to make sure, as I say, that we get this seamless transition underway and that it's successful and with that, I'll yield back, Mr. Chairman. Thanks very much.

*Mr. Curtis. Thank you. The gentleman yields. The Chair recognizes the gentleman from Texas, Mr. Andy Weber.

*Mr. Weber. Thank you, sir. Mr. Rickerson, I'm going to go to you. You're with ERCOT, been there since 2000.

*Mr. Rickerson. Yes, sir.

*Mr. Weber. So, you were there when the Texas legislature did the CREZ project, getting wind energy from the west of the grid. Okay, I was there in 2009 and 2012, so I watched that. Of course, as we know Texas probably produces percentage wise more wind energy than any of the other lesser 49 states. And so, you've watched it for a while.

You said in your comments earlier that 40 days last --

this year exceeded last year's peak, okay? And then you said in 2008 there was 10 megawatts of wind, and now it's 30,000 megawatts, if you need to refer to that. You also said over 500 watts solar, now it's over 18,000 watts if I have those numbers correct. So, we would agree that Texas is very, very renewable friendly. Wouldn't you agree with that?

*Mr. Rickerson. Yes.

*Mr. Weber. You talked about batteries also, but I want to go back to CREZ for a minute. I'm not -- you know, I owned an air conditioning company for 35 years, so we dealt with AC, alternating current, all the time. In fact, I was -- most of the problems with air conditioning is electrical by nature.

I've been shocked so many times it's gotten where it's not much fun, but that's to say when you're talking about battery power, and you mention that it gives control systems a problem, is that because there's a difference in the voltage whether it's direct current or alternating current?

*Mr. Rickerson. Well, it's the power electronics that are used to get the power to the grid has to go through an inverter.

*Mr. Weber. Correct.

*Mr. Rickerson. So, wind, solar, batteries, all use inverters. There are setting on inverters that are necessary for them to be stable when there are voltage fluctuations or frequency fluctuations. Synchronous generators do that a lot better. So, inverters -- older inverters don't do that very well. Never inverters are getting better, but we have a lot of legacy --

*Mr. Weber. Yeah.

*Mr. Rickerson. -- inverters on the system, and those have some stability issues.

*Mr. Weber. Well, that was my next question. You know, does -- as much, you know, new stuff with technology we have, the inverters ought to be better. So, how much frequency deviation can they stand?

*Mr. Rickerson. Well, it varies -- it varies quite a bit from when they -- from when they were manufactured. The newest standards though are going to be up to the same kind of standard that a synchronous generator would have, but we've got, like you said, 37,000 megawatts of wind based generation and 18,000 megawatts of solar based, and some of

the new standards haven't come into effect yet.

*Mr. Weber. Okay. Well, that's very, very interesting. You also -- if you don't mind, you may not have these figures, but I'm talking about a comparison between winter and summer, because you know, I've grown up on the Gulf Coast of Texas -- I lived in the 20 mile radius for 70 years. I've never seen it be 18 degrees on Galveston Island before, so it was very, very cold.

So, the difference -- and as you probably know, resistance heat electric heaters are the most expensive form of heat, and they -- that's nothing but a dead short. I notice you've got a -- a dead short in power. And so, comparing the winter of -- the year it was 2020 -- or 2021, was it?

*Mr. Rickerson. 2021.

*Mr. Weber. 2021 to the summer following, what was the comparison? Do you have those figures in terms of --

*Mr. Rickerson. Well, I can tell you this summer was 85,000. A little over 85,000 in the summer, and we expect a winter peak to be something less than that, but not much less. It seems like over time, our winter peaks are getting

closer and closer to the summer peaks in Texas.

*Mr. Weber. Okay. Well, I'm very interested in all the technical stuff of how that happened, and so that's the reason for those questions, but I do want to segue over to the fact that the legislature has passed reforms, as you know, to seasonal weatherization and new market incentives from more reliable dispatchable power. Can you talk about how the EPA regulations and federal tax subsidies for wind and solar are actually working against ERCOT?

*Mr. Rickerson. Yeah. So, we can do probability studies to look at the probability of entering into emergency operations or even having a load shed in the future, and we can dial the amount of dispatchable thermal generation that are in those studies. And so, we can see that as the generation decreases, if there are retirements in fact, and if we don't have new things come online, then we see the probability of entering into EEA conditions, or emergency conditions increase.

*Mr. Weber. Well, thanks. Of course, we won't make the point that we like the fact that Texas is in charge of its own grid. And then I have one more technical question. I'm

running out of time. So, when you're talking about DC power generation, and there's inverters, or of course there wouldn't be a converter. That would be the other way around. So, are they inverting at the site of the windmill?

*Mr. Rickerson. They are. The inverters are separate from the windmills.

*Mr. Weber. On location, or somewhere --

*Mr. Rickerson. On location.

*Mr. Weber. On location? Okay. Okay. That's very interesting. I'm going to yield back. Thank you so much.

*Mr. Curtis. Thank you. The gentleman yields, and the chair recognizes the gentleman from Alabama, Mr. Palmer.

*Mr. Palmer. Sorry, Mr. Pfluger, I slipped in behind you. I know how that feels. I've been a little busy today downstairs, and I'm happy to be up here to be honest with you, but I do want to talk about this. I've got some serious, serious concerns about where we are in our grid reliability and I'm -- I chair the policy committee. I worked for two international engineering companies. I had a Q clearance, a National Security Clearance for Department of Energy, Department of Defense, and I worked for a company

that built refused energy facilities, another company an environmental system, so I have a pretty good handle on some of this stuff, although a bit dated. I haven't been in there in that field in a while.

But I have serious, serious concerns about how rapidly we're decoupling from hydrocarbon power generation and the potential for serious, serious interruptions in our power grid and the North America Electric Reliability Corporation, NERC, you're all very familiar with them, pointed out that the top threats to our power grid, both relate to changing the resource mix.

They rank pretty far ahead of cyber security and things like that, and I'd just like to hear from you briefly because my time will expire and I know Mr. Pfluger can't wait for that to happen, but do you agree that we have created a serious problem by prematurely decoupling from hydrocarbon, and shutting down nuclear for that matter as well? Whoever wants to start, let's go.

*Mr. Rickerson. I would agree with you. I was on that risk -- that NERC risk committee.

*Mr. Palmer. Mm-hmm.

*Mr. Rickerson. That is -- in my testimony, I think that is the single biggest threat we have is adapting to that changing resource mix.

*Mr. Millar. From California I would say that, no, our biggest risk right now is still the more extreme events caused by climate change. We are expecting to continue to rely on the shaping capability and capacity benefits of natural gas generation into the future while we add additional renewable generation to reduce our carbon footprint.

*Mr. Palmer. And people are leaving California as fast as they can. Mr. Bresler?

*Mr. Bresler. I think we could be putting ourselves in a potential for a reliability problem in the future. Again, it's all about as resources retire, and the fossil fuel dispatchable resources we're seeing retiring are primarily because of federal and state policy requirements, as they retire, we need replacements.

*Mr. Palmer. We're doing it to ourselves.

*Mr. Bresler. We need replacements in the right quantity and with the right attributes.

*Mr. Dewey. Congressman, I think that we've seen a lot of different fleet transitions through the years. One of the things in New York that we're specifically mindful of is not to put all of our eggs in one fuel basket.

*Mr. Palmer. That's smart.

*Mr. Dewey. It's really about fuel diversity. About 25 percent of our power is generated by hydro in New York, about 25 percent from Nuclear, and then the other 50 percent is gas, but 50 percent of that gas as a backup fuel supply can burn oil. So, when the gas is unavailable, there's problems on the gas system like there was during Winter Storm Elliot on Christmas, we kept New York City lit because we had oil reserves in those tanks in compliance with our local --

*Mr. Palmer. My -- the clock is ticking. Just be very, very -- because I have a follow up point I want to make.

*Mr. Suskie. Yes, I'll just briefly say I don't think adding renewables is the reliability challenge. It's the retirement of conventional generations that are a challenge.

*Mr. Palmer. Exactly. That's the point I was looking for.

*Mr. van Welie. Yeah, and I'd say --

*Mr. Palmer. You can just agree with him.

*Mr. van Welie. Okay, I agree with him.

*Mr. Palmer. No, if you -- go ahead. I'm sorry.

*Mr. van Welie. No, I was just going to say that what we do going forward is what's really important, not what's happened in the past. So, I think we've taken the fat out of the system, and that's why we've got to do this in a very deliberate way.

*Mr. Palmer. Okay.

*Mr. Ramey. Transforming the grid is easy in concept. It's very difficult and challenging in practice. There are multiple moving parts and the timing and coordination of making those decisions is critical. As Mr. Bresler said, if the pace of retirements gets ahead of the pace of replacing the lost reliability attributes, that's when we can get into a reliability situation.

*Mr. Palmer. Well, I just want to point out first off all on reconfiguring the grid, that's going to be enormously expensive, and I've seen numbers anywhere from 8 to 9 trillion dollars, and I've seen numbers higher than that, which I don't think we're going to be able to pull that off,

but the other thing is the physics don't work on renewables for even sustaining the economic activity that we'll have much less moving forward to decouple ourselves from China, and my biggest concern about going to a hundred percent renewable, and I've made this point about the war in Ukraine. If you haven't learned anything else about the war in Ukraine, you should understand this.

No nation should be reliant on an adversarial nation for something that's critical to their economic security and their national security as energy, and if we go a hundred percent renewable, we will be a hundred percent reliant on China, and that's not going to end well for us. I yield back.

*Mr. Balderson. Our next up is Mr. Cardenas from California.

*Mr. Cardenas. Thank you Chairman Duncan and Ranking Member DeGette for holding this important hearing, and I want to thank the witnesses for your expertise and your opinions today to help educate the public about some of the things that Americans fortunately can and do take for granted, which is flicking on the switch and the lights are on. I'm glad

that we've convened to discuss grid reliability, because as we all know, nearly all aspects of daily life depend on reliable electricity.

The conversation is timely. We're seeing in real time how our nation is evolving and moving toward a cleaner, reliable energy economy. For instance, with the passage of the bipartisan infrastructure law and Inflation Reduction Act, now cleaner sources of electricity are coming online and bringing economic growth to businesses and the communities that surround them.

Grid operators play an important role in ensuring we can supply Americans with the new, clean sources of energy through interconnecting generation resources. Mr. Millar, just two months ago FERC finalized a new rule, order 2023 intended to speed up the process that allows new generation resources to interconnect with the grid.

The new rule would require RTOs to perform what's called a cluster study process examining a cluster of new generation resources rather than looking at them one by one in isolation. It would also move from a first come, first served process to a first ready, first served process

enabling the most advanced interconnection request to be studied first.

I would hope and think that most of my colleagues here on both sides of the aisle are strong supporters of order 2023. Could you talk about Cal ISO's plan for order 2023 implementation and what lessons Cal ISO has learned through conducting cluster studies?

*Mr. Millar. Thank you. Yes, the ISO, we introduced the cluster study process -- I think it's about 15 years ago now since we moved to a cluster study process, and it generally had been very effective for many years. The -- as we look at FERC order 2023, it also shifts that to being more of a national requirement.

We believe we already comply with much of the order. There are a number of very helpful attributes in FERC order 2023 that we were looking at making additional changes through our own interconnection process, some of the details around the readiness of the project when it actually enters the queue that will be very helpful, and we will also be continuing on with our own interconnection reform process that goes beyond FERC order 2023 to recognize some of our

specific challenges, and the order actually set that out as an expectation that jurisdictions that had additional challenges would be likely to go beyond those basic requirements in FERC order 2023.

*Mr. Cardenas. What improvements has Cal ISO made to efficiently process interconnection requests?

*Mr. Millar. Well, some of the changes we made in the past included restructuring some of the application process, information requirements, and some preliminary steps towards fee restructuring and readiness to actually move forward with the -- with the resource as requirements to move into the queue.

We are looking at additional reforms that will put more emphasis on projects that are in areas of California that the transmission capacity either already exists or is being developed proactively to address resources developing in those areas, and those requirements are probably going to be the most impactful as we move forward and coordinate with our load serving entities on procurement to get those resources being the ones that get contracts, and move forward.

*Mr. Cardenas. Okay, and I would also like to take a

moment to thank you for serving the fifth largest economy in the world effectively, and you don't -- you're not a strong economy without good reliability on energy. Whether it be building out new power sources, creating economic growth, or adapting to mitigate the effects of changing climate, we must expand the grid infrastructure necessary to meet reliability needs of today and the future.

Study after study has indicated that interregional transmission is a vital component of this. That's why I'm proud to have worked with my colleagues, Congressman Peters, Congressman Veasey, Senator Heinrich, and to introduce the FASTER Act to address key factors that have slowed down interregional transmission development.

This is a question to anybody on the panel who would like to answer it. As you think about resource adequacy, how does interregional transmission factor into both meeting future demand and affordability for consumers?

*Mr. van Welie. I'll take a shot at that. I mean, I think --

*Mr. Cardenas. Thank you.

*Mr. van Welie. -- every ISO grid operator relies to

some extent on imports from their neighbors. So -- and so obviously what does that mean? We need to have enough transmission to be able to supply those imports. I think the challenging thing looking forward given the energy adequacy risks that are in the system is knowing whether or not you can count on your neighbor during these extreme weather events. So, I think there's a coupling there.

We've historically assumed that that energy would be available when we needed it, but I think the new phenomenon that's out there is these severe weather events that straddle thousands of miles. So, I think we are going to have to evolve the standards that we operate under in order to make sure that we've got enough reserve energy on the system.

*Mr. Cardenas. Beautiful. Thank you. My time expired, and I yield back.

*Mr. Balderson. The gentleman's time's expired, and I'll go to Mr. Pfluger for five minutes.

*Mr. Pfluger. Thank you, Mr. Chairman. How many engineers in the group? Electrical? Physicist? Okay. So, every one of you almost have engineering. You guys are literally the only thing standing between a massive,

cataclysmic, some sort of, you know, terrible event. I think of a two day, three day power outage in New York City? I mean, crisis right there.

Does it concern anybody that not a single person in the administration knows how much electricity we use in the United States on an annual basis? Not the Secretary of Energy, nobody in the EPA, the Office of Electricity within the Department of Energy doesn't know? Would you -- do you guys operate like that?

I mean, does everybody on this panel know how much electricity you use? I'm bothered by that, and I'm bothered by it because when mandates are put out there, let's just take the EV mandate for instance, where is the power coming from? Nobody knows. It's fairy dust. I want to pick on you guys here. Thank you.

Just on the subsidies that have -- by the way, we have more wind energy in my Congressional district than the entire state of California, just had to brag about that -- the subsidies for renewables in Texas, how has that impacted the ability to continue to build the reliable forms, natural gas and some of the other plants?

*Mr. Rickerson. I think it's had a chilling effect on people investing in thermal generation in ERCOT. It slowed it down.

*Mr. Pfluger. Do you believe that -- we had Commissioner Danly and Christie come talk to us and they said we had a looming resource adequacy crisis in their testimony. Do you believe this is in part due to the oversubsidation of unreliables in this administration's, you know, policy like the clean power plan?

*Mr. Rickerson. I think that when the wind is blowing and the sun is shining we have resource adequacy, but there are times when we don't have that balance, and the only thing you have left then are going to be batteries or thermal generation that can last for long durations.

*Mr. Pfluger. I was in Houston in early September when we hit the peak demand. My district, more wind energy like I just bragged about than the entire state of California, wind wasn't blowing. Dispatchable power was nowhere to be found, so we had to go get the good old reliable clean LNG.

I read your testimony, Mr. Millar. I didn't see the details in it that suggest -- that convinced me that the

resource mixture in California actually does what you say it's going to do. And so, I'd like to ask you a couple of questions.

You -- there is an EV mandate that our administration wants to put into place. Let's just say we did 50 percent electric vehicles in California, which I think is around five percent right now in California. So, let's just say we get to 50 percent by 2030. Is your grid ready to provide that power?

*Mr. Millar. Well, our grid right now is going through a lot of additions, so I don't think it would be practical to assume the grid today can deliver that additional requirement. Part of the purpose of the integrated long term resource and transmission planning is to get the grid ready. As I mentioned, we rely on the state agencies, the California Energy Commission in particular for the load forecasting work, and a very big part of that is including the rate of adoption of electric vehicles and what that means for the rest of the grid.

*Mr. Pfluger. Tell me -- it wasn't in the testimony. Tell me about the mixture.

*Mr. Millar. Sorry, the mixture of --

*Mr. Pfluger. Yeah, the types of -- the --

*Mr. Millar. So --

*Mr. Pfluger. -- primary sources of energy that --

*Mr. Millar. Oh, the primary sources in terms of the public utilities commission's resource plans moving forward, the bulk of the new editions we do expect to be -- continue to be diverse sources of wind, offshore or out of state, as well as some additional in-state resources. Solar, complemented with storage to provide more firming capability because of our peak loads, and relying on the exist gas fleet, except for some aging units, but primarily continuing to rely on the existing gas fleet for at least the next ten years, and --

*Mr. Pfluger. Let me regroup just a little bit.

*Mr. Millar. -- as many of those units phase out, we'll be introducing some additional clean, firm resources.

*Mr. Pfluger. I'm going to submit a question to you on water and the impact that that has on Arizona and Utah and the demand that you draw there. Mr. Rickerson, 50 percent increase in EVs in the state of Texas, are we ready? Can we

do that?

*Mr. Rickerson. If we get some more dispatchable generation, we'll be able to do that.

*Mr. Pfluger. Dispatchable as in --

*Mr. Rickerson. Thermal.

*Mr. Pfluger. Coal? Natural gas? Nuclear?

*Mr. Rickerson. That's right.

*Mr. Pfluger. I yield back.

*Mr. Balderson. The gentleman yields back. I now recognize the current ranking member on the subcommittee, Mr. Veasey for five minutes.

*Mr. Veasey. Thank you, Mr. Chairman. And Mr. Pfluger is absolutely right. They produce a lot of wind down in west Texas, and places like where I live in Fort Worth we're very grateful for that energy generation and the jobs that it creates, and it just reminds me that building a more robust transmission system is perhaps the single most effective tool for improving resiliency and providing customers with greater access to low cost sources of energy whether it be nuclear, renewable, or traditional fossil fuels, and I understand that increasing our transmission assets is not a silver bullet,

but we must make incremental improvements, because there were days -- as you know, there were days this summer that Texans were absolutely on edge about the warnings that they were getting that the grid may not be able to hold up. We had how many days of hundred degree weather in a row? And so for people to hear that, that was -- that was very sobering. There were days that some of the ERCOT's capacity exceeded demand by fractions of a percentage point.

And so Mr. Rickerson I wanted to ask you over the past few years ERCOT's grid system has been tested by severe weather conditions that have greatly stressed the system and at times resulted in rolling blackouts and worse, and I wanted to know what are these major multi-day, multi-million customer blackouts seem to be happening more in our state than in other places?

*Mr. Rickerson. Well, I would say that they don't happen more often in Texas. We had rolling blackouts in 2011, and then during Winter Storm Uri, we had blackouts or rolling outages during Winter Storm Uri. Those were basically ten years apart, and there was a standard of one in ten year loss of load events. Now, last year during Winter

Storm Elliot, we had at least two winters -- one winter, I guess, of lessons learned from Uri.

And so, we had a weatherization process in place where we inspected over a thousand units each year to make sure that they were ready for severe weather. We had a firm fuel process in place where we paid units to have fuel onsite, and that helps decrease the risk of having delivery problems for fuel.

*Mr. Veasey. Yeah. Let me ask you --

*Mr. Rickerson. We had ancillary services that came from Winter Storm Uri as well. So, all those things resulted in a lot better performance during Winter Storm Elliot, and as a result we didn't have emergency operations during Elliot like we had during the other storms.

*Mr. Veasey. Let me also ask you -- I'm sure that you know the other gentleman here that is seated at the table with you, and that you all have, you know, conversations as counterparts. Is there something that is happening in other regions of the country that we should be doing in Texas, that ERCOT could be doing to help, you know, fend off situations like what happened with Uri?

*Mr. Rickerson. Yeah. So, I think we do communicate well across ISOs. We've been the first to implement some things like dynamic ratings online, the weatherization, the CREZ projects.

I think if -- the first thing that comes to mind of something that other ISOs have done that we haven't done is an optimization called real time co-optimization where you can use both of your energy resources and your ancillary services resources and you can optimize that use. We have a project to put that in place that will help during severe weather.

It will just help market conditions as well. That won't be completed until 2026, so that's the first thing that comes to mind when I think about what other ISOs have been able to do that we haven't done that is something we could improve.

*Mr. Veasey. Is there anything that you would like to see the Texas legislature do that would help improve the situation? Is there action that could happen on the state level at our state capitol that you think would help with the grid resiliency situation?

*Mr. Rickerson. I think some of the recent changes that

came out of the last legislative session are very encouraging. Performance credit market mechanism, that market I think is -- has got potential for low interest loans, if that passes, I think that's got some potential for dispatchable generation. I really do think though that dispatchable generation is what our grid needs. We've got to have that stay in balance with the load growth that we're seeing.

*Mr. Veasey. Yeah, let me ask you one quick one before my time is up. In the name of ERCOT contingency reserve service, why has ERCOT essentially withheld electric supply from the market? A lot of people say it's had the effect of pushing up prices.

*Mr. Rickerson. So, that ancillary service is called ECRS, ERCOT Contingency Reserve Service -- is held for slower down ramps. It's an insurance policy that we buy to help with solar down ramps. It also helps with forecasting errors of wind and solar.

Now, when we get into scarcity conditions, we release that, and we use it. So, it's available during the scarcest hours, but it is an insurance policy that we hold back.

*Mr. Veasey. Yeah, thank you. Thank you, Mr. Chairman.

*Mr. Duncan. The gentleman's time has expired, and I'll now thank Mr. Balderson for chairing with me for a while, and recognize him for five minutes.

*Mr. Balderson. Thank you, Mr. Chairman. Thank you all for being here today, and I do want to thank the chairman for holding this hearing today. Increasing demand on the grid through electrification, while at the same time issuing rules and proposals that force our reliable or dispatchable baseload energy into premature retirement is a recipe for disaster.

Maintaining the reliability of the bulk power system with long term and short term is one of the greatest issues facing this nation. So before we get to my questions, I want to specifically thank Chair Rodgers and Chairman Duncan for their continued focus and leadership on this issue.

As we discussed today, PJM's February report shows that 40 gigawatts of existing generation are at risk of retirement by 2030. Mr. Bresler, as I looked up at you, of these 40 gigawatts, how much generation will be retired because of various federal and state policies?

*Mr. Bresler. It's the majority of that 40 gigawatts. There was only a little bit that was forecasted economic retirements.

*Mr. Balderson. Thank you. Can you briefly identify or expand on some of the state and federal policies that were highlighted in a report forcing these premature retirements?

*Mr. Bresler. Well, I mean, some of the state actions, you have the Illinois SIJA Act, which you know, requires retirement of certain fossil fuel resources over a -- over a certain range of time.

There is anticipated actions in New Jersey, those in Maryland as well, and they do similar things there they're projected to, should they actually be enacted, and then at the federal level, the EPA requirements primarily are the ones that were -- that were under consideration for those forecasts.

*Mr. Balderson. Thank you. This report was released in -- released in February exactly three months before the EPA released their proposed rule on the new source performance standards for the greenhouse gas emissions. The proposed regulations put onerous requirements on both gas and coal

fire generation which make up over half of the PJM's generation mix.

I believe in comments PJM submitted to the EPA on the proposed rule, PJM notes that the proposal puts -- the proposal puts an additional 15 gigawatts of coal generation at risk. Is this correct?

*Mr. Bresler. Yes.

*Mr. Balderson. Is that 15 gigawatts of additional generation at risk of retirement by 2030, or what's the time of that retirement based on the proposed rule?

*Mr. Bresler. And so, I don't have the exact time frame off the top of my head.

*Mr. Balderson. Okay, and is there additional natural gas generation that is at risk under the EPA's proposed rule?

*Mr. Bresler. Yes, I believe there is.

*Mr. Balderson. Mr. Bresler, I'm curious about the level of engagement between FERC, NERC, and RTOs like PJM on assessments or reports that focus on long term reliability. Can you briefly discuss how long you coordinated with NERC on their annual long term assessment?

*Mr. Bresler. I don't have specific details as to how

many consultations we had with NERC on that report. I'm sure there was some interaction, but I'm not familiar with the details.

*Mr. Balderson. Okay, we can find that out. Earlier this Congress I introduced the Gril Reliability and Resiliency Improvements Act that would require NERC to consult with FERC, RTOs, and the independent system operators, and issue a report every two years identifying the forecasted requirements, the state or federal policies most responsible for creating policy driven retirements, and whether non dispatchable variable resources connecting to the grid are sufficient to offset these fossil fuel requirements. Those tasked with monitoring and protecting the reliability of the grid must be transparent with the American people on these risks. I'm afraid I'm going to run out of time, but I'm going to try it.

According -- I'm going to stick with Mr. Bresler again. According to the US Energy Information Administration, about 40 percent of the US electrical grid generates its fuel by natural gas, yet even EPA new clean power plan recognizes that natural gas peak in generation will be needed to keep

the light on when the wind and solar are available. Mr. Bresler and Mr. Ramey, do your RTOs rely on natural gas to meet resource adequacy? And Mr. Ramey, you can go first since Mr. Bresler has been answering.

*Mr. Ramey. Yes.

*Mr. Balderson. Yes? Okay. Mr. Bresler?

*Mr. Bresler. Sure. I mean, not entirely of course, but it's a portion of our resource adequacy portfolio, yes.

*Mr. Balderson. What will happen if bigger natural gas generations like combined cycles get shut down?

*Mr. Bresler. We will be less resource adequate.

*Mr. Ramey. We'll be at risk of falling short of minimum planning reserve requirements.

*Mr. Balderson. Okay. All right. Thank you all very much. Mr. Chairman, I yield back. I'll now go to Mr. Pence from Indiana for five minutes.

*Mr. Pence. Thank you, Mr. Chairman for holding this hearing. I think it's a great hearing, and thank you to the guests for being here today. As my colleagues have discussed, our nation's electric grid is heading towards catastrophic failure, as Mr. Pfluger just said a few minutes

ago.

Everyone involved in reliability of the electric grid seems to grasp this reality except the Biden Administration. Unfortunately, decisions affecting our electric grid take years to be fully realized. If we don't act now, large scale grid failures could cripple our economy. This is not a new phenomenon.

For over two years, the grid operators before us today, utilities, power, public power agencies, have all voiced their concern to me and to my constituents at the direction and speed at which this administration is attempting to overhaul our nation's energy system.

Mr. Bresler, in Richmond, Indiana, our public power agency operates a coal fired peaker plant, White Water Valley Sation in MISO's region near the Indiana/Ohio border and close to PJM's footprint. I know that both of you use the power from that plant. Because the powerplant only operates ten percent of the year, EPA had previously exempted certain regulations.

For a plant like White Water Valley Station, which runs on slim margins, these exemptions are critically important to

maintain reliability in the region. Now as the EPA reimposes these regulations, White Water Valley Station's retirement timeline has been accelerated by a number of years. Sir, can you speak to the role of dispatchable peaker plants like Richmond for reliability in your region?

*Mr. Bresler. Sure. Thank you, Representative Pence. So, the role primarily of dispatchable generation is two-fold, again, at a very high level. Number one, overall resource adequacy, ensuring that we have sufficient resources available to meet load in all hours, and to the extent that dispatchable generation retires and is replaced by intermittent resources, we need more megawatts of intermittent resources to replace the same amount of megawatts of dispatchable generation because of the intermittency, because it's unavailable in certain hours of the year and certain seasons.

Beyond the overall resource adequacy question, dispatchable generation also provides right now the majority of the grid services we need, the flexibility, the ramping, those types of services that we need to balance the grid, to operate the grid reliably.

*Mr. Pence. Yeah, thanks, and you know, the gentleman from Texas was talking about kind of the reserve. This plant is a reserve. Takes six hours to get it fired up and running at full bore.

Mr. Ramey, a few weeks ago I held a roundtable with Hoosier stakeholders in Franklin, Indiana, who are working together in earnest to implement features of the electrification policy. Utilities, research universities such as Perdue University, Vincent University, parking and mobility experts, and EV charging station developers joined together in the sixth district to share lessons learned on best practices.

A common theme among the group was the timeliness -- the timeline of this administration's excessive regulations. I'm concerned that the rate at which this administration is pouring out regulations into the electricity sector far outpaces our available technologies. A similar sentiment was shared in MISO's comments to the EPA on their ozone transport rule last spring.

The comments state that MISO has significant concerns about the reliability and reiterating the notion that EPA has

not provided MISO with adequate time to assess their complex, lengthy, multi-source proposal. Since then, a multitude of rules have been proposed by EPA that compounds these issues, namely CCR affluent limitation guidelines, clean power plant 2.0 and more. Can you speak to the time frame your organization needs to sufficiently review these types of regulations so that we can get the job done?

*Mr. Ramey. Thank you for the question, Congressman. We coordinate closely with our members on their retirement investment plans and schedules and we build analysis around those plans to the extent that there are regulations or legislation or even changes in member plans that affect our base outlook, we do need time to incorporate those changes into our analysis to give our members enough time to react to the output so that they can take action to mitigate any --

*Mr. Pence. So, is the --

*Mr. Ramey. -- adverse reliability impacts that could result.

*Mr. Pence. Are -- is the EPA listening to your suggestion that they're pushing you too fast, pushing members too fast?

*Mr. Ramey. There have been cases in the past where they have -- they have reacted to our comments and adjusted their final rules accordingly. It has provided us some relief along those lines. There are several pending rules out there that we have given some comments to, and we get to see --

*Mr. Pence. Well, I sure hope that they don't force us into a catastrophic event. With that, Mr. Chair, I yield back.

*Mr. Duncan. The gentleman yields back. I'll now go to Mr. Carter for five minutes.

*Mr. Carter. Thank you, Mr. Chairman, and thank you for allowing me to waive onto this committee, and thank all of you for being here. This is extremely important. I have the honor and privilege of representing South Georgia. I represent the entire coast of Georgia, over a hundred miles of pristine coastlines.

We don't have RTOs, as you know, in the southeast, and -- but you know, for the ninth year in the row, we are the number one state to do business in, and one of the reasons for that is because we have reliable, affordable energy. If

we didn't, we wouldn't be obtaining that kind of an award and that kind of recognition.

In the other two, unlike the other two-thirds of the country, the NERC has not identified the southeast as facing -- as facing an elevated risk of blackouts, and this is important, because in South Georgia, it gets hot. Up here in Washington, they have four seasons. In South Georgia, we only have two, hot and hotter, and it has been hotter, and we cannot afford brownouts, we cannot afford blackouts, but you know, it just confuses me because in RTOs, I don't know who has accountability.

I do know who has accountability in Georgia, and that is the utilities. We -- they are the ones who are responsible for making sure that the power stays on, as I'm sure every one of you know, we just opened up a third reactor at Plant Vogel, a nuclear reactor, and we've got a forth one that's coming on very soon. We've got a good mix of energy sources in the southeast and in South Georgia, so we're very proud of that.

But the RTO, it seems to be a quasi-governmental entity that doesn't have control over the entire process, and I'm

just -- you know, it's kind of like if everyone is responsible, then no one is responsible. I want to ask you, Mr. van Welie. So, if the lights go out in your RTO, who is responsible?

*Mr. van Welie. Well, I think the region as a whole, because we've all held hands and decided to operate the system the way we're operating it. So, the choice you're teeing up is between sort of the old style vertically integrated sentry plan system, versus what's happening in two-thirds of the country which is a migration to wholesale markets.

My point earlier on is if we're going to do wholesale markets, we need to do them properly. And so, I think that means that we've got to make sure that these markets get the resources in place and ultimately pay for the reliability.

*Mr. Carter. Well, who is making sure of that? Who is ultimately responsible for making sure that that happens?

*Mr. van Welie. So, ultimately it's a shared decision, because the FERC is the regulator that approves the market designs, but they are presented to them by the RTOs which have to go through a stakeholder process. So, it makes it

for a very messy and complicated process.

*Mr. Carter. Well, it's just foreign to me, so I'm having trouble kind of wrapping my arms around it and understanding --

*Mr. van Welie. Mm-hmm.

*Mr. Carter. -- you know, who is -- who is going to be responsible. I mean, we -- you know, I'm very throwish, very simplistic, and we just go straight at it in South Georgia and Georgia as a whole. So, it is a little bit foreign. I want to go to you, Mr. Millar -- Millar -- Millar or Millar? Anyone?

*Mr. Millar. Millar is fine.

*Mr. Carter. Anyone? Anyway, obviously we know the reliability issues that we've had in California, and we've heard --

*Mr. Millar. Yeah.

*Mr. Carter. -- about the rollout -- or, excuse me, the brownouts and the blackouts that they've had, and now we're hearing about mandates for EVs, and yet the governor is saying that he doesn't want you charging them up, and you know, you can't help but wonder what's the ultimate plan

here, but is that acceptable in California to have the blackouts and the brownouts?

*Mr. Millar. So, blackouts and brownouts are not acceptable, and as I mentioned earlier, our biggest challenges have been associated with the wild extremes we've been getting in wind events or weather events coming back to climate change. In terms of the responsibility --

*Mr. Carter. You know, I apologize, and I just have to -- I just -- I mean --

*Mr. Millar. Sure.

*Mr. Carter. -- if you know that's going to happen, you got to be prepared for it.

*Mr. Millar. And, yes, so, in addition to the -- I'll say the more conventional planning, which is the responsibility of the public utilities commission to set the direction for what's required based off of load forecasts derived from the energy commission that's responsible for load forecasting including the pick-up for electric vehicles, recognizing that we -- every year, we've been facing more extreme weather events that the state of California has also introduced a strategic reserve of additional capacity to

access when we're in those extreme events.

The normal planning addresses what's required under -- to meet normal industry standards around typical probabilities, but we also have to accept that we are facing a period of far less predictability.

*Mr. Carter. Well, and I appreciate that, but look, guys, you know, simplify, simplify, simplify, and I just think you're making it tougher than it needs to be, but of course that's just me, but I would point to Georgia. We've been pretty successful. So, thank you, and I yield back, Mr. Chairman.

*Mr. Duncan. The gentleman yields back. I now go to Dr. Joyce for five minutes.

*Mr. Joyce. First, I want to thank Chairman Duncan for holding today's hearing on such a critical issue that is facing so many Americans, and for allowing me to wave on. My constituents have PJM as their regional transmission organization, and I'm worried about the serious grid reliability issues that are on the horizon.

Last year, when an artic storm hit the northeast, temperatures in my district fell below zero degrees

Fahrenheit on Christmas Eve. Water pipes across the state, including in my wife's medical office, froze, and the grid in our region came dangerously close to being overburdened. The Biden Administration's use of regulations to drive coal power plants out of business has depleted the amount of dispatchable power that is available to the grid.

We continue to see this happening in Pennsylvania where the Homer City generating station, the largest coal power plant in the state, began decommissioning just months ago at the end of summer. To put it bluntly, we are not building natural gas power plants fast enough to replace the closing coal power plants, and I am gravely concerned about what just one severe winter could do to my constituents in Pennsylvania.

My first question is for both Mr. Bresler and Mr. van Welie. Mr. Bresler, your testimony raised concerns about the reliability impact of scheduled fossil generation retirements in PJM in the coming years, and the lack of a firm 24/7 resources in line to replace them. It's clear to me that whether your goal is to maximize the usefulness of intermittent resources to promote domestic energy

independence, or to ensure enough baseload generation to protect the reliability of the grid, it is clear American produced natural gas is the answer. Mr. Bresler, do you agree that natural gas is and will continue to be the critical part of our country's energy mix well into the future?

*Mr. Bresler. It is certainly a critical part, so we need resources to maintain resource adequacy and serve demand at all hours, and yes, natural gas is a critical component of being able to do so.

*Mr. Joyce. Do you have concerns that recent actions from this administration, including the recently released 111 rule for new and existing natural gas power plants could jeopardize that important role?

*Mr. Bresler. As documented in the report that you referenced, if we don't see replacement resources on the scale that are necessary and with the attributes that are necessary, yes, we could be looking at a reliability issue in the future.

*Mr. Joyce. Mr. van Welie, do you feel and agree that natural gas is and will continue to be the critical part of

our energies mix?

*Mr. van Welie. Yes. It's the only practical answer for the next several decades. I mean, ultimately you can replace natural gas over time with other fuels, but that's going to take public policy support and investment.

*Mr. Joyce. The only practical answer over the next several decades. I think your message is clear to us. Mr. Bresler, in the Fiscal Responsibility Act, Congress directed NERC to complete an interregional transfer capability study. Some of my colleagues have either pushed legislation or urged FERC to take regulatory action that would pre-judge these conclusions by picking an arbitrary mandatory minimum without regard to any demonstrated need, or any factual findings. Do you agree that Congress should keep the ball in NERC's court, and allow it to finalize its recommendations before moving forward with legislation that might not align with such recommendations?

*Mr. Bresler. I think the development of transmission assets, whether interregional classification or not, should be based on analytics around the need and the benefit of that transmission in concert with the resources that we have

available to maintain resource adequacy. So, there needs to be that level of analytics put forward to it. I don't think it should be prejudged.

*Mr. Joyce. Analytics that align with what is available to us. That's a great message. Mr. Bresler, in my remaining time, PJM has a well-established planning process which can be utilized for public policy driven transmission projects. This process in a diverse area such as PJM allows for flexibility when it comes to achieving state policy goals, and importantly determining who pays for transmission development. Can you speak to the benefits of the state agreement approach?

*Mr. Bresler. Yes. I think they've been exemplified by the way it's been utilized by New Jersey most recently. So, New Jersey has ambitious offshore wind goals. They came to PJM and asked us to work with them to plan for the transmission necessary to interconnect phase one, now into phase two of their offshore wind development, and we successfully planned what would be necessary in order to do that, and New Jersey would commit to paying for that transmission to integrate those resources.

*Mr. Joyce. Again, Chairman Duncan, thank you for holding this important hearing and allowing me to waive on. I yield back.

*Mr. Duncan. The gentleman yields back, and I think we're concluding the question and answer portion. I want to thank Mr. Veasey for filling in for Ranking Member DeGette, and I would like to thank all of our witnesses for being here today.

I've been here 13 years, and this is one of the best, most informative hearings I think we've had on a very critical issue. Members may have additional written questions for you all.

I remind members they have ten business days to submit additional questions for the record, and I ask that witnesses do their best to submit responses within ten business days upon receipt of the questions. I ask unanimous consent to insert in the record documents included on the staff hearing documents list. Without objection, that will be the order, and without objection, I want to thank the witnesses again, and we'll stand adjourned.

[Whereupon, at 1:59 p.m., the Subcommittee was

adjourned.]