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Committee on Environment  
and Public Works Washington, D.C.

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BUILDING BACK BETTER: ADDRESSING CLIMATE CHANGE IN THE  
ELECTRICITY SECTOR AND FOSTERING ECONOMIC GROWTH

Wednesday, March 10, 2021

United States Senate

Committee on Environment and Public Works

Washington, D.C.

The committee, met, pursuant to notice, at 10:04 a.m. in room 406, Dirksen Senate Office Building, the Honorable Thomas R. Carper [chairman of the committee] presiding.

Present: Senators Carper, Capito, Cardin, Merkley, Markey, Kelly, Padilla, Inhofe, Cramer, Lummis, Boozman, Sullivan, Ernst.

STATEMENT OF THE HONORABLE THOMAS R. CARPER, A UNITED STATES  
SENATOR FROM DELAWARE

Senator Carper. Good morning, everybody. I call this meeting to order. Senator Capito and I are pleased to be joined this morning by a distinguished panel of witnesses to discuss climate change and our electricity sector. Mr. Rusco, who is here in person, welcome. Mayor Garcetti, I presume, is out in California. Mr. Fowke, Ms. Snyder, Mr. Wood, we welcome you, one and all.

Experts talk about climate change in technicalities, things like "parts per million" or "carbon dioxide equivalent." Get beyond these terms, though, and the reality is really more severe and the urgency more apparent.

In Texas last month, as we know, that reality hit home. An estimated 4.5 million Texans lost power, some stranded for days on end in the freezing cold without heat or running water. Families literally froze to death, were poisoned by carbon monoxide, or trapped in home fires.

Overall, the crisis took the lives of 80 people, and the estimated damages to people's homes, to their businesses, and to their livelihoods are expected to reach over \$90 billion. It is heartbreaking, and it should never have happened in this Country.

It is clear that Texas was ill-prepared for the unusually

frigid temperatures. Gas-fired power plants, a nuclear reactor, coal plants, and some wind turbines, and natural gas wellheads all succumbed to temperatures that they were unprepared for. This wasn't the first time we have seen devastation fueled by climate change, and sadly, it won't be the last.

As we will hear today from Mr. Rusco, a report released this morning by the Government Accountability Office found that climate change is expected to have far-reaching effects on the electricity grid that could cost the American people tens of billions of dollars in damage and power outages, like the devastation we have just seen in Texas, but a future of more suffering from climate change is not written in stone. We can invest in a cleaner, more resilient electric sector. As our President says, we need to build back better.

A judge once asked, our committee has heard me say this more than a few times. I love to tell this story. A judge once asked a fellow named Willie Sutton, a notorious bank robber during the Great Depression, and purportedly asked Mr. Sutton, "Mr. Sutton, why do you rob banks?" Mr. Sutton replied, famously, "Because that is where the money is." When people ask me, "why do we need to reduce power sector climate emissions," I say, "because that is where a good deal, not all, but a good deal of the emissions are."

As it turns out, the electricity sector is the second-

largest driver of climate change in our Country, the second largest. Transportation, mobile sources, are the first, responsible for about 28 percent of our Country's total greenhouse gas emissions. Electricity is the second, the source of 27 percent of the Nation's total emissions, and industry is the third, accounting for about 22 percent. If my math is any good, that adds up to more than three-quarters, more than three quarters of the greenhouse gas emissions in our Country.

If we want a cleaner, safer planet, and we do, all of us, we have to make the reduction of electric power emissions a top priority.

President Obama understood this, and that is why he set a national target to reduce power plant emissions by about 32 percent below 2012 levels. The Clean Power Plan was crafted after taking and responding to 4.3 million public comments and working with local leaders and stakeholders. I double checked, 4.3 million. That is the correct number: 4.3 million comments. I asked her, were they responded to? And the answer was, apparently, just about every one of them.

But there were plenty of critics who argued, several years ago, that these national targets were too ambitious. President Trump agreed, and he repealed the Clean Power Plan and replaced it with an unambitious, ultimately illegal plan that was thrown out by the courts.

It turns out that the critics could not have been more wrong about the Clean Power Plan. American utilities are already far surpassing its goals. We will hear soon from one of our witnesses, Mr. Fowke from Xcel Energy, about how his company is on track to reduce 85 percent of its carbon emissions by 2030. Let me repeat that: 85 percent of its carbon emissions by 2030.

This move toward clean energy didn't happen by chance. State and local programs are driving the energy markets and utility decisions to go clean.

Today, 30 States have adopted a mandatory renewable or clean energy standard for their electricity sectors, 30 States. Fourteen of them have plans in place to transition to 100 percent renewable or zero-emission energy.

Dozens of utility companies have pledged to decarbonize their electricity in the coming decades. Forty percent of American households are now served by utilities that have pledged to completely decarbonize by 2050. This is encouraging progress, but the one way that we can get to a truly clean and safe electricity sector is if we come together and chart a lasting, bipartisan path forward.

Like President Biden, when I hear the words clean energy, the words that come to mind for me are job creation, and we need that. We need every job we can create and grow.

Clean energy can create millions of good-paying jobs, strengthen our economy, and build a more sustainable future for our children and for our grandchildren. We have a real opportunity to make this happen for the American people, and I think we have an obligation not to let them down.

With that, I am delighted to turn to our Ranking Member, Shelley Capito, from the great State of West Virginia, for her opening statement.

[The prepared statement of Senator Carper follows:]

STATEMENT OF THE HONORABLE SHELLEY MOORE CAPITO, A UNITED STATE  
SENATOR FROM THE STATE OF WEST VIRGINIA

Senator Capito. Thank you, Mr. Chairman, and I want to thank all of the witnesses who have joined us, both here today and remotely, and I appreciate the opportunity to talk about an issue that is extremely important to everybody.

I think the recent cold weather disaster that the Chairman talked about in Texas and similar weather-related outages in the past few years have revealed two major challenges in the electric sector that policymakers must address.

One is most certainly reliability. We need to ensure our energy systems are resilient to the impacts, such as extreme weather storms, wildfires, or cyberattacks. If an emergency occurs, we want to make sure that any of those impacts are minimized and are remedied quickly.

The other is affordability. Building and maintaining a power system, especially with innovative technologies, comes at a price. We need to make sure we are not making it unaffordable to turn on those lights, especially during and after an external challenge to grid reliability, and also for those who are in the low- to mid-incomes, where the higher cost of utilities are particularly difficult to manage.

I would suggest there are two key strategies this committee to support to advance these related goals.

First, we need an all-of-the-above energy strategy. Clean energy is not just wind and solar power. It includes nuclear energy, low-carbon natural gas, hydropower, geothermal, battery storage, and electricity generated conventionally from fuels like coal with innovative technologies, such as carbon capture utilization and sequestration. Fuel diversity will pay dividends in addressing reliability by providing the flexibility to switch sources of one generation becomes unavailable.

Despite the progress some may seek to ignore, American emissions have steadily decreased in the power sector over the last decade, while global emissions have risen, especially in China.

As of 2019, carbon dioxide emissions from the power sector have decreased by 33 percent since 2005, and 2017 marked the ninth time this century that the U.S. reduced emissions more than any other nation, thanks primarily to the revolution in domestic natural gas production.

We need to continue to build up America's energy leadership and invest in innovation and innovative ways, which directly ties in with a theme I have mentioned before: we can't build back better if we can't build anything at all.

While general oversight of the grid is not within the committee's jurisdiction, proper permitting absolutely is. Certainty in permitting and consistency of regulations is

essential for building the relevant infrastructure to achieve our goals of reliability and affordability.

For too long, States and project sponsors have been stuck in a regulatory purgatory, seeking endless approvals from up to thirteen different Federal agencies. Additionally, dozens of State and local approvals are typically required before construction.

Building on the streamlining provisions enacted under Title 41 of the FAST Act and the creation of the Federal Permitting Improvement Steering Council, the One Federal Decision policy called for early coordination and predictable timelines to deliver decisions in a timely manner without compromising any environmental protections. However, One Federal Decision was revoked under one of President Biden's first actions in office when he signed Executive Order 13990.

It will be hard to deliver on clean energy if permitting complexity represents an unsurmountable challenge. As one example: new wind and solar projects are often constructed hundreds of miles from consumers, far from existing transmission lines to move that electricity where it is needed. Without the ability to timely permit new transmission, the ambitious goals set by President Biden of zero emissions by 2035 is just a costly pipedream.

If there was any doubt as to the path my Democrat friends

want us to think about, I think if we look at what has happened, and I see my colleague here from California, and I am really pleased that we have Mayor Garcetti on the panel, because I want to look at what is specifically going on in the city of Los Angeles.

According to the Bureau of Labor Statistics, in January, Los Angeles households paid 52.2 percent more for electricity than the nationwide average in the same month. That is despite LA's famously beautiful and milder weather. This is nearly 7 percent more than Los Angelenos paid last January, so the trend is going in the wrong direction on affordability for the City of Angels.

On reliability, according to the U.S. Energy Information Administration, in 2019, the average American lost power for approximately 4.7 hours, including as a result of extreme weather events like floods, blizzards, and hurricanes. In California, also in 2019, customers had 9.87 hours without power, which is more than a five-hour difference, which doesn't sound like much, but when you look at it percentagewise, it is double the amount of time.

Wildfires and controlled outages aren't the only blame. Outages in non-fire months were also up, compared to 2018, and Los Angeles led the way with 5,787 blackouts in the year 2019, impacting more than 6.4 million customers. Goes to my

reliability premise.

This is before ambitious plans to electrify transmission and to shutter the State's remaining nuclear plants and put pressure on its natural gas plants. I noticed that the Mayor is going to be closing, I think it said three natural gas plants.

California, its demand for power and lack of generation stresses the systems, also, of their neighboring States. For now, it looks like things will continue to go in that direction in California. I suggest that we can do it a better way for the rest of the Country, but I don't disagree with everything that the Mayor has put forward. In his testimony, he hit on my other premise of where I think we need to go.

I was very pleased to see, and hope to engage him on, to see that he is very interested in the permit streamlining aspect of getting cleaner energy to every household. This is certainly something I agree with him on, and I believe should be a priority for our committee.

I thank the Chairman, and I would like to take a moment. Should I introduce my West Virginian, or should I wait to do that, Mr. Chairman?

[The prepared statement of Senator Capito follows:]

Senator Carper. Why don't you go ahead right now?

Senator Capito. Okay. Never a bad time to introduce a West Virginian, that is for sure, as you know. I want to thank all the witnesses here, and I want to thank particularly Jim Wood for being here to join us to testify.

Jim Wood is the Director of the Energy Institute at West Virginia University, where he also serves as Director of the U.S.-China Clean Energy Research Center Advanced Cold Technology Consortium. In 2019, Mr. Wood was appointed by our governor, Jim Justice, to his Downstream Jobs Task Force. The task force is working to bring manufacturing opportunities to the State ahead of the anticipated expansion of the petrochemical industry in Appalachia.

Additionally, Jim has 30 years of experience in the power industry. He came to West Virginia University in 2014 from ThermoEnergy Corporation where he was chairman, president, and CEO of the Massachusetts-based company focused on industrial waste-water treatment and power generation technologies. Prior to that, prior to WVU, Jim was Deputy Assistant to the Secretary of DOE's Office of Clean Coal for President Obama. He was responsible for a \$4.5 billion program for research and demonstration projects related to carbon capture and storage, advanced power generation cycles, fuel cells, and advanced integrated gas combined cycle processes.

I am really happy to have Jim. I have relied on him as an expert for me, to help me. I am happy to have him in West Virginia at WVU. We are really pleased to have him in this committee today. Thank you.

Senator Carper. Thank you, Senator Capito. Mr. Wood, welcome. I was born in Beckley, so it is nice to have another West Virginian in the house, and in fact, in the room, even if virtually.

Next, I want to recognize Senator Padilla, and see if he might introduce another one of our witnesses, whose name has been mentioned, the mayor of the largest city in California, the city of the angels. Senator?

Senator Padilla. Thank you, Mr. Chair, and Ranking Member Capito for inviting me and allowing me to introduce my friend, the mayor of the second-largest city in America, my friend Mayor Garcetti. Mayor Garcetti is a fourth-generation Angelino, born and raised in the San Fran Valley, just like me. He is a true public servant. We served together on the Los Angeles City Council once upon a time. He is an intelligence officer in the United States Navy Reserve, and currently serves as the 42nd mayor of the city of Los Angeles.

Throughout his tenure, among his priorities has been leading the way with some of the Nation's most ambitious climate goals, particularly helpful over the course of the last four

years, as the prior administration retreated from the global stage. Mayor Garcetti mobilized mayors across America to adapt to the Paris Climate Agreement.

The City of Los Angeles has the largest municipal electrical and water utility in the Country. We refer to it as the Los Angeles Department of Water and Power, and that utility is rapidly and successfully meeting California's State renewable energy goals ahead of schedule.

Additionally, Mayor Garcetti has served in leadership roles for LA Metro, our transit agency for the region, not just the City of Los Angeles. From his time serving as chair, he is advanced the electrification of the bus fleet for Metro. As the leader of the largest municipal utility in the Nation, along with leadership of one of the largest metropolitan transportation systems in the nation, Mayor Garcetti has had a critical voice locally, regionally, and nationally on climate change, not just for the sake of achieving climate goals, but for fostering economic growth and opportunity.

So colleagues, please welcome my friend, Mayor Eric Garcetti.

Senator Carper. Thanks for that introduction.

Mayor Garcetti, can you hear me?

Mayor Garcetti. I can, thank you. Can you hear me okay?

Senator Carper. Yes. I am a retired Navy captain and used

to be stationed up and down the coast in California during the Vietnam War.

Mayor Garcetti. Wonderful.

Senator Carper. I was a naval flight officer, P-3 Aircraft mission commander, and also the intelligence officer for my squadron. I understand, are you still in the reserves?

Mayor Garcetti. Go Navy. No, last year, two years ago, I dropped out. Thank you for your service.

Senator Carper. That is great. Well, thank you, and thanks for your service in that capacity, too.

We have some other distinguished witnesses on today's panel. Frank Rusco I personally welcome here. Frank is live and in-person here for today's hearing. He is the director of the National Resources and Environment at the Government Accountability Office, a great team of people whose job is to really serve as our watchdog and try to help us be more fiscally responsible. We thank you, Frank, for joining us and send our best to your controller general and your colleagues.

We are also fortunate to have two other witnesses join us virtually: Ben Fowke, who is the Chairman and Chief Executive Officer at Xcel Energy. Welcome, Ben. I have son named Ben; it is one of my favorite names.

Also, Sandra Snyder, Vice President for Environment at the Interstate Natural Gas Association of America, and we thank you

all for joining us today.

Mr. Rusco, why don't we start with you, and you may proceed when you are ready. Take it away. Thank you.

STATEMENT OF FRANK RUSCO, DIRECTOR OF NATURAL RESOURCES AND ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. Rusco. Thank you, Chairman Carper, Ranking Member Capito, and members of the committee. I am pleased to be here today to discuss the need for greater climate resilience of the electricity grid.

The fourth National Climate Assessment, published in November 2018, warned, among other things that extreme weather and other disaster-causing events will increase and that adaptation measures will need to be taken to avoid large societal losses. In addition, the electricity grid, as part of electricity, or energy infrastructure more broadly, is considered a critical infrastructure that should be resilient to all hazards to protect public health, safety, the economy, and national security.

Our report being issued this morning looks at climate resilience of the electricity grid in this context. We found that the costs of large power outages, as occurred recently in Texas, are likely to cost many billions of dollars annually unless the grid is made more resilient to climate-related extreme weather: wildfires, sea level rise, and flooding. These include the direct costs of repairing damage caused to the grid, but also include significant but hard to quantify broader societal costs. These latter include the costs to consumers and

businesses that lose power during climate-related events.

They also include public health and safety disruptions when power to other key sectors is disrupted. Importantly, the cost borne by consumers during power outages are not equally distributed across income levels. Frequently, lower-income consumers suffer disproportionately during power outages because they have less access to alternative power sources, such as rooftop, solar, or generators, and fewer resources to be able to temporarily relocate out of the affected area. Lower-income populations are also less able to afford increases in electricity rates, which is ultimately the way investment operations and maintenance costs of the grid are covered.

So, how do we know what investments to make, and how can it be paid for? GAO's disaster risk framework provides some ideas. First, the Federal Government needs to play a role in providing quality information to all stakeholders, including private owners of the grid, State and local regulators, and rate payers about the risks associated with climate-related power disruptions. This can help State and local regulators understand the need for resilience measures.

Secondly, the Federal Government can play a role in integrating and coordinating across stakeholders to achieve a consensus on what specific actions need to be taken.

Third, the Federal Government can provide positive

incentives or reduces disincentives to encourage resiliency measures to be undertaken. DOE and FERC are the key Federal agencies at play here. DOE has the capacity and has taken many steps in cooperation with some utilities, national labs, and other key stakeholders to identify climate change risks to the grid.

However, DOE needs to develop a plan to guide its resilience efforts, and to better leverage the National labs in these efforts. DOE also needs an agency-wide strategy for enhancing grid resilience to climate change risks. FERC, similarly, needs to better identify and assess climate-related risks to the grid and plan a response using its authority over grid reliability.

While DOE and FERC can help identify and plan what resilience measures should be taken, this still leaves a question of how it will be paid for. GAO does not offer a solution here, but some observations from our body of work may be useful. First, climate change poses risks to environmental and economic systems and creates a fiscal exposure to the Federal Government. The Federal Government can reduce this fiscal exposure if Federal efforts are coordinated and directed toward common goals, such as improving climate resilience. Secondly, climate resilience will take a whole-society approach to determine what measure to take and what parts of society bear

what costs. Lower-income populations often bear a disproportionate burden during disaster events and are less able to pay for individual resilience measures or for those built into the greater system.

Lastly, as the fourth National Climate Assessment advises, even though there remains uncertainty about the precise effects of climate change in every sector, acting sooner, rather than later, while prudently learning along the way, is the appropriate path toward climate adaptation.

Thank you, this ends my oral statement. I will be happy to answer any questions you may have.

[The prepared statement of Mr. Rusco follows:]

Senator Carper. Mr. Rusco, you have given us a lot to chew on, and we look forward to asking you some questions in a little bit, but let's turn to our other witnesses first. Mayor Garcetti, we thank you again for joining us, I presume, from the west coast.

Please proceed into your testimony, Mayor. Welcome. Thank you.

STATEMENT OF THE HONORABLE ERIC GARCETTI, MAYOR OF LOS ANGELES,  
CALIFORNIA

Mayor Garcetti. Thank you so much, Chairman Carper, Captain Carper, Ranking Member Moore Capito, to the entire group there, and thank you so much, Senator Padilla, who I enjoyed tackling energy policy together when we both sat next to each other in the Los Angeles City Council. Two decades later, we are so proud of your representation of our golden State. Great to be with friends like Senator Duckworth and Senator Sanders, Senator Inhofe, who I visited with in his office. Thank you for the honor. I am so excited to be able to testify on this important issue before you today.

I lead America's second-largest city, where I oversee the Nation's largest power and water utility that is municipally owned. We have an energy demand equal to that of the State of Colorado, just to be able to picture what our challenge is every single day.

I am here to say, in no uncertain terms, that an energy grid that is 100 percent renewable, reliable, and resilient can be achieved. Los Angeles is proof. In 2002, our utility was just 3 percent renewable and 60 percent coal. Today, we are 40 percent renewable, and by 2025, we will have zero percent coal.

We are forging this new reality in Los Angeles, and seeing it happen in cities nationwide. As a founding member of Climate

Mayors, a bipartisan group of over 500 mayors who are Republicans, Democrats, Independents, we know that clean energy transformation isn't just possible; it is a necessity.

We are excited, too, about this work, because it is creating economic opportunity: jobs, investment, it is keeping the lights on, and it is fueling the next generation of American innovation.

Now, a lot of cities are buying green power on the grid, and that is great. It is an important part of this transition. But in LA, we own our utility, so we have to build it from scratch. We are building a renewable grid on our own. In other words, transitioning to clean energy from soup to nuts, all while having to keep the power flowing 24/7. That is power for ventilators that are keeping loved ones alive today, that is power for our port, the largest in the western hemisphere, that helps Long Beach bring 40 percent of all the goods into your States across the Country, power for stadiums and venues that will soon propel our economic recovery.

Even as our State did face some rolling blackouts, we haven't had a single rolling blackout in Los Angeles, because we have made sure that renewable energy is also reliable energy. We have connected to partners across the western United States, co-owning and co-building the Hoover Dam, hydropower in the Pacific Northwest, wind power in Wyoming and New Mexico, green

hydrogen in Utah. Coupling this with our local, distributed power inside the basin, on Los Angeles rooftops and in batteries, we are saving people money. So, it is not the rate of electricity, it is what you pay on your bill that anybody cares about, and count this: \$1.5 billion in savings from energy efficiency alone since I took office eight years ago.

But you have seen the news. Climate events are getting more frequent. They are more dangerous; people are literally losing their lives, so our work is that much more urgent.

Two local examples underscore this point for me in Los Angeles. We are used to heat, but in July 2018, we had the temperature spike 108 degrees that day, one of the hottest days on record. Though we had invested in infrastructure, cables melted. Distributing stations overloaded. Some lost power for three days. It wasn't an issue of power; there was plenty of that. It was just climate change. It is time for us to change that old book.

The second example, you know well. The Saddleridge Fire of 2019, 8,800 acres that burned, and we came very close to losing our transmission into Los Angeles. We came within an inch, for the first time, of rolling blackouts, but they never came, because we could rely on local energy, panels on rooftops that kept the energy going. Scary moments, but not isolated ones.

Whether it is destructive wildfires in Senator Merkley's

State, the record-breaking heatwaves in Senator Kelly's State, the recent storms in Texas, there are two questions that occupy Americans, especially young Americans: how do we save our planet, and where is my place in that planet?

We are answering that in Los Angeles with what we call the five zeros: a zero-carbon grid, zero-carbon buildings, zero-carbon transportation, zero waste, and zero wasted water. We are on our way to 55 percent renewable energy by 2025 and 80 percent by 2036, 100 percent no later than 2045. We are tapping into American innovation, working with the National Renewable Energy Lab to have the biggest study of its kind in American history to get there to make it more reliable and cheaper.

One example, we invested the largest solar plant in the Nation's history for the cheapest price ever in the world for both generating and storing electricity, 280,000 households worth, and it is cheaper than a new gas plant. We look at our ability to not only invest in jobs, but to invest in the future.

So, our advice, make your investments bigger and bolder and faster. Scale up a national green bank. Expand our EV tax credits to help our drivers go electric, and so much more. In other words, federal urgency has to match local drive, and trust me, we will have local dollars to match that as well.

I think I have reached my five minutes. I look forward to questions and answers, but this is the moment to think big, to

act fast, and yes, to Senator Capito, to also look at the regulatory power to unleash American creativity.

Thank you, Mr. Chair.

[The prepared statement of Mayor Garcetti follows:]

Senator Carper. Mayor, thank you so much for those words.

We will now turn to Mr. Fowke. Mr. Fowke, you are recognized to present your testimony. Please proceed.

STATEMENT OF BEN FOWKE, CHAIRMAN AND CHIEF EXECUTIVE OFFICER,  
XCEL ENERGY

Mr. Fowke. Thank you, Chairman Carper, Ranking Member Capito, and members of the committee. My name is Ben Fowke, and I am the Chairman and CEO of Xcel Energy, a Minnesota-based public utility holding company serving 3.6 million electric customers and 2 million natural gas customers in eight Western and Midwestern States. I also serve as Chairman of the Board of the Edison Electric Institute.

Xcel Energy has long been a clean energy leader. In 2020, we achieved a 51 percent reduction on carbon dioxide emissions from 2005 levels. Just over two years ago, I announced a two-part goal for Xcel Energy's electric business: to deliver 100 percent carbon-free energy by 2050, and in the interim, to reduce our carbon dioxide emissions by 80 percent by 2030.

Xcel Energy is a clean energy leader because we can take advantage of the extraordinary wind and solar resources in our backyard, but our whole industry is moving. Since December 2018, more than two dozen EEI member companies have established zero or net-zero targets on their own.

The good news is our strategy is working. We have announced plans to greatly expand our portfolio of low-cost renewables, extend the life of one of our nuclear units, build new, efficient natural gas-fired generation, and retire or

reduce the operation of our coal plants.

These plans will reduce emissions while keeping service reliable and affordable. They rely on proven technologies, especially renewable energy. By 2030, we estimate that renewable energy will make up about two-thirds of our energy mix.

However, renewable energy can only take us so far. At higher levels of intermittent renewables, the cost of the energy system begins to skyrocket, and its reliability degrades. That means the whole industry, even Xcel Energy with our remarkable renewable resources, will need some form of new, carbon-free, 24/7 dispatchable generation to remove the last increment of emissions on our system and get to our goal of zero.

These technologies may include hydrogen, advanced nuclear, advanced renewables like deep geothermal, carbon capture or storage, or other things, perhaps, that we haven't thought of. I believe public policy can make these technologies a reality, and we, along with EEI and environmental groups, are encouraging Congress to pass a carbon-free technology initiative focused on Federal policies that will encourage their deployment.

These technologies require the kind of innovation that I know America can deliver. With the right policies, I am confident that our laboratories, companies, and entrepreneurs can develop these technologies and create new jobs and

remarkable opportunity both here at home and abroad, but these technologies won't be available overnight.

Until they arrive, we will still need natural gas and existing nuclear generation on our system. Natural gas and nuclear will facilitate high levels of renewable energy and maintain grid reliability. New natural gas will only operate when needed, perhaps a small number of hours a year during peak demand when renewables aren't available. In the next two decades, at least, natural gas and nuclear do not stand in the way of the energy's clean transformation; I believe they enable it.

In other words, we need a balanced, diverse energy portfolio, and that is the key to an affordable, reliable energy system. The extreme weather that impacted our Nation during President's Day weekend made that clear. We don't serve that portion of Texas that was most affected, and for our system, we were able to maintain electric power and natural gas service for our customers, but we did experience the enormous fuel cost increases.

I would also say that the reliability of our system was no accident. It was the result of actions we have taken over the last decade to invest in a balanced resource mix, one that includes nuclear, coal, gas, wind, and solar. We relied on all these resources during the cold snap. We also invested in the

resilience of our generating resources. For example, equipping our wind turbines with cold weather protections and making sure our natural gas fired plants are winterized and equipped with dual fuel capabilities. I believe going forward, we must assure the resilience of our Nation's natural gas production and pipeline system, because I believe we are going to be needing it more than ever going forward.

I think with the right policies, electric utilities can lead the Nation to an affordable, reliable, and prosperous clean energy future, and Congress can help. We believe the right kind of clean energy standard would help promote the clean energy transformation. To accelerate clean energy development, Congress must also reform the current clean energy tax incentives by providing a direct pay option and addressing tax normalization. I have provided more detail about these tax policies with my written testimony for the record.

I want to thank you for the opportunity to speak today, and I very much look forward to your questions. Thank you.

[The prepared statement of Mr. Fowke follows:]

Senator Carper. Mr. Fowke, thanks very much for those comments. We are delighted that you have been able to join us.

Next in our lineup, batting fourth, cleanup, Ms. Snyder. Ms. Snyder, please proceed.

STATEMENT OF SANDRA SNYDER, VICE PRESIDENT OF ENVIRONMENT,  
INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA

Ms. Snyder. Chairman Carper, Ranking Member Capito, and members of the Committee, good morning. My name is Sandra Snyder, and I am the Vice President of Environment at the Interstate Natural Gas Association of America, INGAA. Thank you for holding this hearing and the opportunity to testify.

INGAA appreciates the committee's focus on climate change, energy reliability, and fostering economic growth as we build back better. INGAA's members transport natural gas through an underground network of pipelines that is analogous to the interstate highway system. These transmission pipelines typically span multiple States, and they link major natural gas supply basins and consumption areas. This extensive network has been built and maintained using private capital.

I have four main points I would like to convey. First, the natural gas transmission and storage sector has continued to make progress on reducing greenhouse gas emissions. Second, natural gas enables cleaner, reliable, and affordable energy across the U.S. and the world. Third, infrastructure permitting predictability is key to building back better, and fourth, natural gas empowers critical energy services vital to our economy.

The natural gas transmission and storage sector has been

and continued to be committed to being part of the climate solution. Between 2011 and 2019, the average methane emissions from natural gas transmission and storage compressor stations decreased by 31 percent. Even as we made these improvements, in 2018, INGAA issued voluntary commitments to further reduce methane emissions from our facilities.

In January of this year, INGAA's members went further by committing to working together as an industry to achieve net-zero greenhouse gas emissions from their natural gas transmission and storage assets by 2050. Our members are committed to reducing the carbon intensity of their infrastructures by reducing emissions from the transmission of natural gas using new technologies and exploring opportunities for our infrastructure to potentially evolve in the future. To be successful, greater investment into research and development will be necessary, as well as new constructive energy policies and practices.

Natural gas infrastructure enables reductions in carbon dioxide emissions across the U.S. and global economies without compromising reliability or affordability. Between 2005 and 2019, CO2 emissions from the U.S. power sector declined by 33 percent, with fuel switching to natural gas accounting for more than half of those reductions.

Additionally, to support the growth of renewable energy,

members of INGAA will provide the services necessary for flexible, fast-ramping generation and reliable energy storage to minimize the risk of power disruptions. An INGAA survey found that interstate pipelines delivered 99.79 percent of firm contractual commitments to transportation customers at the primary delivery points in their contract. Furthermore, liquefied natural gas exports from the U.S. can help other countries meet their energy needs while also reducing emissions.

Clarity and predictability in the infrastructure permitting process are key to building back better. Interstate natural gas pipeline projects typically are subject to regulatory oversight by multiple Federal agencies, including FERC, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service.

To increase access to natural gas, complement the growth of renewable energy, and deliver lower-carbon fuels, we need permitting predictability and clear regulatory requirements that can be applied in a consistent fashion. Our members' projects have sometimes faced years of litigation because certain States refuse to comply with Congress's clear direction under the Clean Water Act regarding the timeline and scope of their authority to assess water quality impacts.

EPA recently engaged in notice and comment rulemaking and revised its Clean Water Act, Section 401 regulations to prevent States from overstepping their authority. Similarly, CEQ

amended its NEPA regulations last year to address many of the issues raised in litigation, including the scope and content of a federal permitting agency's need for review. A lack of regulatory clarity and predictability hampers development in the natural gas industry, as well as other sectors that are trying to move America toward a cleaner energy future.

Finally, natural gas is a foundational fuel that empowers our current and future economy. We need stable and affordable energy to recover from the pandemic, while creating new jobs, fueling economic growth, and minimizing greenhouse gas emissions. Approximately one-third of the natural gas consumed annually in the U.S. is used for power generation. Natural gas is also used to produce products and services such as food preparation, cars, computers, prescription drugs, and construction materials, so even as the opportunities for renewable energy may expand, there will continue to be a need for natural gas and associated infrastructure.

Thank you again for the opportunity to testify.

[The prepared statement of Ms. Snyder follows:]

Senator Carper. Ms. Snyder, we thank you for joining us.  
Thank you very much for your testimony.

Last but not least, from West Virginia, the Mountain State,  
Mr. Wood.

STATEMENT OF JIM WOOD, ENERGY INSTITUTE AT WEST VIRGINIA  
UNIVERSITY

Mr. Wood. Chairman Carper, Ranking Member Capito, and members of the committee, thank you for the opportunity to give testimony and to answer your questions. Senator Capito, thank you also for your generous introduction.

West Virginia University is a public, land-grant, research-intensive university founded in 1867. It is designated an R1 Doctoral University by the Carnegie Classification of Institutions of Higher Education. Funding for sponsored research programs from all sources exceeded \$194 million in fiscal year 2019-2020.

Examples of West Virginia's innovative research activities include developing a rare earth oxide extraction process using acid mine drainage and other coal mine wastes. This research is being done with the support of the National Energy Technology Laboratory and in collaboration with Virginia Tech and Rockwell Automation; replacing high carbon-emitting steam methane reforming processes with catalyst thermochemical conversion of methane to CO<sub>2</sub>-free hydrogen and solid pure crystalline carbon; developing techniques and technologies to integrate state-of-the-art down-well innovative fiber optic and micro-seismic sensors to make improvements in data collection and production tools with advanced big data and machine learning applications

for accurate reservoir characterization and modeling of the Marcellus and Utica shales; research into technical and economic advances of renewable geothermal sources of energy. WVU, in conjunction with Lawrence Berkeley, Cornell, and the West Virginia National Guard are researching designs for the deep direct use of this source on campus.

Finally, we sponsor the National Alternative Fuels Training Consortium, which is available to train people. It is national, and it is available to train people to maintain vehicles powered by alternative fuels, including electricity.

There are a number of important practical considerations in addressing the challenges facing the electricity sector in respect to climate change and fostering economic growth.

First is affordability. Just as manufacturers seek low-cost labor or advanced mechanisms to reduce the cost to produce a product, when electric rates rise, manufacturers will seek low-priced sources of electricity in order to remain competitive. This will slow economic growth in areas unable to attract manufacturing and will shift cost recovery away from industry and toward non-industrial consumers. Today, there are manufacturers searching, even demanding, low-cost electricity from renewable sources.

Second is reliance and reliability. Most commercial forms of electric generation are designed, constructed, and operated

to be very reliable. A natural gas, combined cycle client can operate nearly 100 percent between proper maintenance periods. Wind turbines can operate for three years between oil changes, but require preventative maintenance two to three times a year, which is obviously scheduled when the wind is not blowing.

Third is diversity in generation. The wind farms in West Virginia are on mountain ridges because that is where the wind blows. Gas generation can occur wherever there are viable pipelines. Coal-fired generation is the principal source of electricity in West Virginia, and the supplies of coal are plentiful. Solar generation may have a tougher time, as West Virginia's terrain is pretty bumpy, and the northern parts of the State are cloudy from October until mid-spring.

Fourth is grid stability. The grid operator must have a viable plan for providing power to offset the effects of intermittency associated with wind and solar energy. Grid design and operations must be well-integrated with locations and amounts of renewable and non-renewable sources of generation and hardened against cyber security.

Fifth is storage. There is a 32-megawatt lithium ion battery storage project in conjunction with a 98-megawatt wind project near Elkins. The Energy Institute has begun discussions with the Army Corps of Engineers on its use of data, which may point to areas that can be used for pumped storage. Storage

technology will need improvements in order to provide effective and economical replacement energy during periods of renewable intermittency.

Between 1990 and 2018, West Virginia's CO2 emissions declined 13.3 percent, only one of 15 States in the United States. The implication for us is the cost-effective CCUS must increase in order to be able to retain some amount of coal and gas generation in the State to help offset the intermittency problem. Passage of 45Q tax credits was a boost to CCUS, but in all, capital costs still exceed benefits available to CCUS systems, and in some parts of the State, the geology is unsuitable for sub-surface storage of CO2.

I hope this information is useful, and I thank you for your time and your attention.

[The prepared statement of Mr. Wood follows:]

Senator Carper. Thank you so much for those comments.  
Great of you to join us.

Senator Capito and Senator Manchin and I are beginning the early planning working with Aspen Institute for a workshop in West Virginia, maybe in Morgantown in late spring that focuses on how do we help make sure the folks whose jobs, whose previous jobs have gone away, how do we help make sure that they land on their feet and have a bright future as well as we work to reduce the amount of carbon pollution in our Country and our planet.

I just want to task each of you to give us a good idea on how to do that. Give us a good idea on how to do that, how to better ensure that the folks who are facing real hardship because their contribution, if you will, is toward helping reduce carbon dioxide in our planet, that contribution has lost their, in many cases, livelihood. Your advice on what we can do to help, reach back and help them.

Let's just start, if we could, with Mr. Rusco. Any thoughts that you have, Mr. Rusco, and then we will just go right down the line. Go ahead, Mr. Rusco.

Mr. Rusco. Thank you. I think that the energy system is in a wide transition. It started, really, with the advent of lower-cost natural gas as a result of the hydraulic pressuring innovation, and that has been the primary driver behind retirements of coal plants and nuclear power plants, as well.

The rapid expansion in recent years of renewable resources has also helped with, or furthered, that transition. Further transition that we need to think about is almost every major car manufacturer in the world has now said they are going to electrify their fleet sooner rather than later, and so we are really looking at a massive transition in energy. That will have implications on jobs regionally, and there will need to be thoughtful policies in place to try to find work and training in new sectors for people who are losing their job as a result of this transition. I am sorry I don't have specific ideas.

Senator Carper. That is fine. That is good, hold it right there. Let's turn next to, I would like to go to our Chairman of Xcel. Would you go ahead, and I think it is Ben, Ben Fowke, would you give us some ideas, please, and try to use about a minute of your time. Thanks.

Mr. Fowke. Yes, I will be brief. We are already dealing with this, and there is nothing, it is very personal when it is your community or your job that is being lost as part of this clean energy transition. What we have done is be proactively talking to our employees and our communities well in advance, giving long lead times.

For our employees, we are using natural attrition, retirement. We are retraining any employees that want to continue to work at Xcel, so they can have other jobs, that we,

I think, develop very good partnerships with our unions in that regard.

For our communities, what we would like to do is typically repurpose that site with replacement generation, so that tax space is preserved. We also doubled down on their economic development efforts, and we have been very successful in bringing businesses into those communities using that existing infrastructure in place.

It has worked out, quite honestly, pretty well, so that is what we are doing. That is what we plan to do going forward.

Senator Carper. Great.

Ms. Snyder, any thoughts you have, please. Just briefly, use maybe a minute, please.

Ms. Snyder. Natural gas is a foundational fuel that we view as being very necessary to address the climate solution. I think that, going forward, we are very committed to expanding the availability of natural gas and complementing the renewable sources that may be growing out there, so being part of that process, and also transporting lower-carbon fuels.

So we do think that there will continue to be jobs available in our industry, and we recognize the need to keep the cost of energy down, so that that is not having a negative impact on other parts of the economy. It is so important to manufacturing industry, as well as small businesses like

restaurants that they have affordable natural gas available.

Senator Carper. Good.

Mr. Wood, please. Thank you.

Mr. Wood. Thank you. I am more inclined to think about planning, first, and acting right after the planning. I think we need to stimulate R&D in renewables. There is nothing that I know of yet that is going to stop the intermittency of the existing renewables that we have.

When the wind doesn't blow and the sun doesn't shine, you don't get power. If you don't have power, you have to have an ability to bring power from outside into the areas that were served by that.

So I think that is the first thing is to plan this process so that wind and power and other renewables are going to exist. You will be able to substitute power from outside that area, so that is one.

Second is, I think we need some work on development of lithium. Electric batteries are going to require lithium. That is something that we don't make a lot of in the States. It is being made a lot of in China. Third is, besides making electricity with natural gas, we think there are other things we can do with natural gas to make products.

Senator Carper. Good. We will explore that later.

Mayor Garcetti, would you just give it a couple brief

ideas?

Mayor Garcetti. We are hiring, and it has been part of the great success of what we are doing to transition for our energy and climate needs to see our economy get a huge boost. By 2030, 100,000 new jobs, and as much as about a third of the job growth, which outpaced California, which outpaced the Country up to the last recession here in LA, has come from green jobs. I know that is a term that gets misused a lot, but you can start union-paying good jobs, smart meters to new lines, transmission, et cetera. We are investing jobs in Utah, we are investing jobs in Wyoming, in New Mexico, and other places, as well.

A couple concrete things I would say, one is a national training center for infrastructure jobs. You can do this; you can do this especially with people who have been left behind in the economy, communities of color, poor communities, rural communities, where folks need that transition. We could show you some examples of that that we have done in Los Angeles.

And targeted local hire and allowing local hire for infrastructure, which I know the Senate will take up later, hopefully, this year, is going to be absolutely critical to making sure those jobs are local and that you find specific people, not just statistics, but people who are transitioning from one job to the next. Make sure you find out who they are, train them with our community colleges, our labor unions can be

very useful too, and get them in these new, good-paying, middle-class jobs.

Senator Carper. That is great. Okay.

I skipped over one of our witnesses, and we will come back later and ask you to just respond to the same question. Thanks very much.

Senator Capito. I am going to yield my time; I am going to let Senator Inhofe go. I am not giving up my time; I am just letting him go in front of me.

Senator Inhofe. I appreciate that very much. I have another committee that is going on right now that I have to be there for, so thank you very much for that.

Mr. Fowke, we had problems throughout the Country during this cold spell that we had. In fact, my State of Oklahoma is the coldest it has been since 1878, I think. So that is something that we have not experienced before.

But we handled it real well, and we handled it. If you look at our neighbors down there in Texas, they had outages, they had all these problems. We didn't have those problems, and I have to say that it was coal that saved the day. Normally, coal is about 10 percent of our mix, and we had to use up to 40 percent. That is the reason that we didn't have the problems that some of the other cities had.

I think that speaks to your concern about the fuel

diversity and how important that is. I would say, if our grids were operating on renewable alone, during that storm, what would that have looked like? Would it have been more outages, or less?

Mr. Fowke. Well, I don't think the big grid can operate on renewables alone. I think it does need to be backed up, Senator, and I think, increasingly, the Nation is moving away from coal and towards natural gas. But you know, we have to have better coordination between the power sector and the gas sector, because the interdependencies are not getting less, they are getting greater.

We also have some coal, we have some natural gas, and all those, our plants worked. They were ready to go, so I think it can be done without coal, but you are going to have to have a dispatchable resource, and I think that is natural gas.

Senator Inhofe. My point is the diversity. That is what saved us in the State of Oklahoma. Then also, the statement, when you said it in your opening remarks, we wrote it down because I liked the way you said it. You said for the next two decades at least, natural gas and nuclear do not stand in the way of the industry's clean energy transition, they make it possible. That is a great statement.

I would like to ask Ms. Snyder, do you agree with that statement?

Ms. Snyder. Yes, I absolutely do. Natural gas is foundational to our energy system, and I think it is going to play a very key role in addressing climate change.

Around one-third of electricity is generated using natural gas right now in the U.S., and our system is extremely reliable. Looking at a survey of the INGAA members, which are the Interstate Natural Gas Pipelines, over a 10-year span, they were able to meet their firm contractual commitments 99.79 percent of the time, so we know how important that reliability is. We are looking forward to the future to expanding the availability of natural gas complementing renewables, as well as transporting lower-carbon fuels.

Senator Inhofe. That is good. Well, I appreciate that very much, and the one thing that I wanted to get into, and I think there is time now, Ms. Snyder, to address this, and that is the NEPA permitting reform.

In the previous Administration, of course, there was a lot of criticism of our previous president on their feeling about the reforms. I have always felt anything that takes five years can be done in two years. At that time, they were talking about the Council for Environmental Quality found the average time to complete the environmental impact statement was four and a half years, which I felt was far too long. The president at that time said, we can do it in two years, so we made some reforms

there.

I would like to have your opinion. Do you think that the improvements that were made during that time served to our advantage in NEPA reform?

Ms. Snyder. Yes, I do. NEPA is the most litigated environmental statute out there. As you said, it takes some time in order to complete these environmental reviews. These environmental reviews are necessary before our infrastructures in the Interstate Pipeline Industry can move forward and before FERC will issue a certificate in order for it to operate.

But many different federal agencies are involved, and I think that programs such as the One Federal Decision are just common sense to try to get the federal family to work together, cooperate, share information, and work based upon a timeline.

Senator Inhofe. I agree with that, and I think that a lot of people are not aware of the fact that it is not just gas, it is the wind industry also supported those reforms. I think most all suppliers benefited from those reforms. Thank you very much, Mr. Chairman.

Senator Carper. Thank you, Senator Inhofe. I think we have joining us by WebEx Senator Cardin, my neighbor in Delmarva. Senator Cardin, if you are there, take it away please. Thank you. You are recognized.

Senator Cardin. Thank you, Mr. Chairman. Thank you very

much. I have enjoyed the testimony of our witnesses. Thank you for holding this hearing; I think it is critically important.

As we look at building back better, how do we have an electric grid that meets the challenges that we have, the realities of climate change, and can reduce carbon emissions? That needs to be our goal.

So I want to try to cover two points, if I can, during my time. First, 20 percent of our total electricity is generated by nuclear power, but it is over 55 percent of the carbon-free electric productions.

So as we are talking about building back better, we have a very old nuclear fleet. Any specific suggestions as to the importance of at least maintaining our capacity for nuclear generated electricity, and how can we go about doing that? What type of additional federal policies are needed in order to be able to maintain our capacity for nuclear power? Mr. Wood, you are in the energy business.

Mr. Wood. Well, I can't agree with you more. I do not think we can afford to take two steps backwards by losing our existing nuclear fleet, because you have the stats perfectly. It is 55 percent of our carbon-free energy, and I am fortunate that I operate in a vertically integrated environment, so I can convince my regulators, hopefully, of the importance of nuclear.

But when you are in a deregulated market and you are

competing against pure price, the carbon-free attributes of the dispatchable resource aren't always recognized, so I think there are ways we can preserve the nuclear fleet with grants. I think there was legislation proposed around that, or through tax incentives, and I think it is extremely important that we look at that going forward.

I also try to be technology-agnostic on these technologies. They will get the last bit of carbon off our grid, but I am a big fan of next-generation nuclear and things like small, modular reactors.

Senator Cardin. So, let me go to my second subject, and that is the use of technology. We are behind technologically. It was mentioned during this panel, the technology on battery storage. We are not where we need to be.

As we are looking at building back better, what type of incentives can we put into congressional action that will advance technology in America, so we can be the leader, not only in developing the technology, but to coin the technology, so we have a much more efficient system? We know that certain sources of carbon-free energy are difficult to store. Advancing these technologies could not only help up with a more modern capacity to deal with the needs, but also do it in a much more environmentally friendly way.

What suggestions do you have in order to advance technology

such as battery storage? Anyone on the panel who wishes to respond, I would be glad to hear from you.

Mayor Garcetti. I will jump in, Senator. Thank you so much for the question.

One of the things we are doing in Los Angeles is we are investing in transportation technology. It was mentioned by Senator Padilla. We passed the Nation's largest transportation measure at the local level. It is actually a one-cent, never sun-setting sales tax that is going to provide about \$120 billion in the next 40 years.

I want to land those next-generation bus companies in America. I want to produce the lithium from California, where we are looking at places to pull lithium from the ground. I want to see the R&D, which you saw brilliantly from California, land a rover on Mars just a couple weeks ago.

We have folks ready to do this, but we do think that the Federal Government can play a big role in investing. Working closely with the National Renewable Energy Labs, for instance, it wasn't a bunch of elected officials; it wasn't a political thing when we went to them saying, how do we get Los Angeles to 100 percent renewable without carbon-spewing fuels, they did it as scientists. It is clear that investing more in those will help us compete globally.

We are still buying most of our batteries abroad. We need

to be producing those locally and the elements of them, and I think the transportation sector is a very robust place where that infrastructure investment can double down, making sure that innovation comes from America.

Senator Cardin. Mayor, I think your points are well-taken. I would just encourage specific recommendations as to what we could include in an infrastructure bill that would help advance that type of investment here in America, because we know it is happening globally.

Mayor Garcetti. One specific thing would be to have a national consortium to put a national institute together for transportation innovation. Right now, that doesn't exist. That is something you could locate.

Through DOT or DOT and DOE together, I think, would be a brilliant place to put that. Right now, it is being done very well by people in the private sector off and abroad, but here in the United States, we don't have that today, and I think that would be a welcome part of an infrastructure patch.

Senator Cardin. I thank you for the suggestion.

Thank you, Mr. Chairman.

Senator Carper. Thank you so much.

I believe Senator Capito is next. I think she is going to yield to Senator Cramer, and after that, if she doesn't reclaim her time, Sheldon Whitehouse will be next in line, by WebEx.

All right, Senator Cramer, I think you are on.

Senator Cramer. I thank you, Mr. Chairman. Thank you, Senator Capito. Thank you for this important hearing and this important topic.

As you know, this is sort of in my wheelhouse. I spent nearly ten years as a utility regulator at the North Dakota Public Service Commission, where we had not just direct regulation over the price, regulation over utilities like and including Xcel Energy, but integrated resource planning, siting of a lot of things, including big transmission lines, pipelines, interstate, intrastate, energy conversion facilities of all types, including thousands of megawatts of wind.

But reliability was always at the forefront. In fact, I like to say we were doing resiliency before most people thought it was cool.

But as you know, as we have said, this is largely FERC jurisdiction. About three years ago, there was a docket, they opened a resiliency docket, and then just a few weeks ago, they closed it with zero conclusions and zero recommendations.

I would say in light of the recent outages in California, Texas, and the upper Midwest, their lack of action is an abject failure to recognize the problem and provide answers to it.

I want to submit, however, a dissenting opinion. Commissioner Danly's dissent really said it well: "the bottom

line is this: as long as we have markets that procure the wrong types of generation and in the wrong quantities, because the resources providing the greatest reliability benefits are insufficiently compensated, we will continue to see events like those in California and Texas." I would just highly recommend everybody to read it, and without objection, I would like to submit it to the record.

Senator Capito. [Presiding.] Without objection.

[The referenced information follows:]

Senator Cramer. Mr. Fowke, as you know, I have been a strong proponent of nuclear, and I just want to associate myself with everything that Senator Cardin said.

By the way, the bill about the regulation overseeing all of that, we have got to streamline it. There is no reason not to, and so I associate myself with everything that he said.

I want to piggyback a little bit on something you said that Senator Inhofe quoted, and that was when you said that nuclear and gas don't have to stand in the way, in fact, they are part of the solution. I would submit to you, there is not a better fuel in the world than nuclear for accomplishing the goals that you want to accomplish. I say that because I think it can, it is not parochial to me.

We don't have any nuclear in North Dakota. Xcel has very little generation at all in North Dakota, even though you are our largest utility. But we do benefit tremendously from your nuclear plants in Prairie Island and Monticello. I once got trapped in Monticello because my polyester pants put out too much radiation, or something.

[Laughter.]

Senator Cramer. Anyway, I am just going to associate myself with what he asked and end with your answer, and I appreciate that very much, but you also said, you said something else, and it raised a question for me that gets to a point. I

don't mean it to be rude, but we don't have polar vortexes in our part of the Country, as you know. We have winter. They seem like vortexes to some people, but not where we live.

Xcel Energy is not just an electric utility, but you are a gas utility as well, both in my State as well as others. One of the things I worry about with regard to natural gas, not just as a bridge, but somehow as a substitute for real good baseload electricity is, when we are confronted with a 40 degree below zero day, which is not as uncommon as people might think, certainly 30 below is not, 20 below is not, but those are the days the wind rarely blows.

You as a utility, if you are confronted with either heating your home with natural gas or curtailing it to generate electricity to keep your computer operating in your home, which do you choose? It seems like a ridiculous question, but it is meant to make a point, and I would welcome a response.

Mr. Wood. I will tell you, even our wind turbines, with the winterization package, they can't work below minus 22. To answer your question, you always choose a rolling electrical blackout versus gas-out, because the difficulty of relighting homes safely is incredibly time-consuming. So during the Winter Storm Uri, all of our fossil generation, including our nuclear generation worked.

But the natural gas plants, we switched them to oil. We

don't use it very often, but we switched to oil, and we were able to divert that natural gas that would have been used into the LDC for home heating.

Senator Cramer. Let me just add in my final sentence here, that I don't want to leave anything off of the table as a solution. I am all about your ambitious goals, and I don't think we can get to your ambitious goals of 2050 carbon-free without some reforms to the permitting and siting process for building the infrastructure necessary.

But I don't want to leave out things like carbon capture utilization and storage, either. I think we are not that far away. If we don't kill the innovators, we are not that far away from actually having even fossil energy being largely, if not completely, carbon-free, so I want to work with people on the solutions, not argue so much about the problems.

With that, I yield.

Senator Carper. [Presiding.] All right. Thanks for that.

I am going to ask unanimous consent to submit for the record a report from the Energy Research and Consulting Firm, Wood Mackenzie, and other related articles. These materials describe that the recent blackouts in Texas were caused by failures across the entire energy system, natural gas and coal included, due to lack of weatherization, lack of energy reserves, and inability to draw on resources from the rest of

the national grid.

[The referenced information follows:]

Senator Carper. All right. With that done, I think Senator Whitehouse is going to be recognized, thanks to the generosity of Senator Capito. Sheldon is going to join us by WebEx, and then back to our Ranking Member. Then after her, Senator Padilla, Senator Wicker, and joining us from Alaska actually live in-person, Senator Sullivan.

Senator Whitehouse, you are on by WebEx. Welcome.

Senator Whitehouse. Thank you, Chairman. Good to be with you.

Thank you, Ranking Member Capito, for letting me jump in here.

To the last comment by Senator Cramer, I think that carbon capture has a very important role in our climate solutions. Ranking Member Capito and I have worked very well together on carbon capture solutions, and we are working right now in my office on an expansion of the direct air capture credit to help expand innovation into that space, so that it doesn't have to be so geographically limited. So there is probably not a lot in energy policy where Senator Cramer and I agree, but here we have overlap, so that is great.

I do want to say with Ms. Snyder here how very disappointed I have been in the way that the natural gas industry conducted itself recently with regard to methane leakage. We were working, I thought, extremely well with the industry in the

previous Administration. I thought the industry saw the cliff that coal went off of and that oil was headed for, and knew it had a longer runway and wanted to prepare for the transition in a responsible way, and understand that its methane leakage was the biggest part of the problem. We had an agreement about measuring that leakage and all of that.

Then came the Trump Administration, and all of that just got undone. We are now trying to rebuild. But I think a lot of things got burned in those years. One of them I just have to say was a lot of trust with the industry. I hope we have the chance to rebuild that.

Mr. Fowke made the interesting point that nuclear, I think his phrase was, nuclear's carbon-free attributes are not always recognized. That is a problem I have been trying to work with for some time. I couldn't agree more. We have been trying to figure out a way to perhaps get existing safely operating nuclear plants into a 45Q type compensation for the carbon-free nature of their power so they don't artificially compete unsuccessfully against new natural gas facilities.

I would love to have your thoughts on that, and if you want to give me give me those thoughts at some greater length with some reflection, I would be happy to take that as a written question for the record that you can respond to. I would also like you to think a little bit about what we can do to speed up

major transmission lines to the areas in our Country where there is abundant solar and wind.

Short story, I drove through the Wind River Reservation in Wyoming, which is three times the size of my home State, and went through miles of what seemed just completely vacant space that the wind was screaming across and the sun was beating down on. The two tribes who share that reservation are losing the snowpack that provides the summer water for them. It is basically their summer water storage, so they are looking at real trouble because of climate change.

It would be great to be able to have industries like that take up in that great big reservation. Yet, it can't happen because there is no transmission line. So a solution to that and build back better would be something I would welcome. I would love to have your brief comments on those.

Mr. Fowke. On the nuclear side, I mean I think it is going to extend things like PTC, ITC. We ought to consider PTC for the existing nuclear fleet and put it on a level playing ground, and I think nuclear could compete with an even playing field.

On the issue of transmission, let me just give you an example. We knew that we needed to have more transmission, and so we started our clean energy journey at the beginning of the 2000s. We just completed that transmission a few years ago, so it took 15 years to get it built, and that is inter-regionally.

I think what you are talking about is to even more expand the highways. So permitting, cost allocation, those are the things that really bog it down. I think we have had some comments before on having to streamline things like NEPA, et cetera, to make that more efficient. It is absolutely going to be necessary.

Senator Whitehouse. Well, I will try to work on that and build back better, because we are going to be doing a lot of building as a result of that bill.

Mr. Chairman, I think I have probably gone over my time. I can't see my clock.

Senator Carper. No, you have got another 24 seconds to use yet. Go ahead, Sheldon.

Senator Whitehouse. I will just say another kind word about direct air capture, which I think is a great opportunity for us.

Senator Carper. All right, thank you. Looking at the roster here, after Senator Whitehouse, we are back to Senator Capito.

Senator Capito. Thank you. Thank you, Mr. Chairman.

Thanks, all of you, and I want to ask Mr. Wood my first questions. We have talked a lot about individual generation and how we are going to meet the challenges, and one of the things I think that you have talked about is diversity of energy sources,

particularly as it relates to manufacturing.

If we are looking to keep our manufacturing base, and part of build back better is bringing more American jobs, manufacturing jobs back into this Country, do we need the diverse set of energy resources to power our domestic industries? Can we do it all on renewables and our capital investments in manufacturing, based on the presumption that they get access to affordable and reliable electricity?

Mr. Wood. Thank you for the question. I think the answer is definitely no. We can't do it only on renewables until we have a solution for the intermittency. I can imagine what Elon Musk was thinking after he decided to move to Texas, and lo and behold, he lost electricity for a long period of time, and now he is going to build a 100-megawatt storage facility outside of Houston.

I would like to ask him what he thinks about running a plant that loses electricity and that can't get replaced because there is no replacement power that can connect with that part of Texas.

So, I don't think so. I think what I said before, which is a planning first process ought to take place where we understand where the large sources of renewables are, what kind of renewables they are, how far we want to transmit them, and where we have sources of non-renewable electricity that we can use,

including, of course, gas to replace that. Gas is, I understand, gas and nuclear, but gas is a little bit better for this renewable intermittency, because gas units can change load fairly quickly. And when the wind stops, if you are not going to shut down the plant, you are going to have to change sources of energy very quickly. Nuclear has a pretty good record in changing loads, but not as good as gas plants.

Senator Capito. Thank you. Thank you again for being on the panel.

We have heard a lot about the NEPA process being 4.5 years. I mentioned in my opening statement that we can't build back better if we can't build. Senator Whitehouse just talked about transmission, and the scarcity of transmission in certain areas that could be helpful.

So, the timelines that we are looking at for full renewable and net-zero emissions, 2035, this is a question for everybody. I know we have talked a lot about this, but unless we can get these things permitted in a much shorter time frame in terms of transmission and pipelines and other things, I don't know how we can get to this aspirational goal of zero emissions in the power sector by 2035.

We will just start with our guest here, Mr. Rusco, if you have any comments on that from your report.

Mr. Rusco. Well, from previous work, we know that the

concerns about permitting are real. We have to deal with multiple agencies.

It really helps if you have a lead agency that coordinates. It also helps if you have a pre-application period, where everyone can be brought together, all the stakeholders. Those are the things that work. Some of the things that are sort of out of the federal realm are when you get in a lawsuit, that sort of stops everything, and I don't know what the Federal Government can do about that part.

Senator Capito. Thank you.

I am going to go to Mayor Garcetti on this one, because you mentioned at the end of your remarks, it is interesting, you know, we have heard from the industry, we have heard from others.

But you are a quite large municipality. I don't know how many times my State you are, but a lot. So from your perspective, the permitting issue, since you mentioned it, how does that impact you in your very large city?

Mayor Garcetti. Well, thank you, Senator. Absolutely.

We have so many different regulatory authorities between the State and Federal Government. Streamlining that would be important since we clearly do have an infrastructure that is through multiple State. Weatherizing critical systems, for instance, with strategic locations, both locally and regionally,

should be a part of build back better, and maybe require them by code. But then streamline the permitting, so that if it is required by code, it can be by right.

As we do this major grid redevelopment, that would be a very positive thing that I think all Americans could rally around to create that resilience through the diversity that we need and the investments that we need to have.

Senator Capito. Thank you.

Senator Carper. Thank you. Thank you, Senator Capito. I think Senator Markey might be next, and he is right here, in-person. Senator Markey, welcome.

Senator Markey. Thank you, Mr. Chairman, very much.

A clean energy standard is going to be absolutely essential to ensure that we create the right metrics to guarantee that we meet the high standards, which are going to be necessary in order to match the magnitude of the problem.

As you already said, Mr. Chairman, one in three Americans already live in a city or a State that has a 100 percent clean electricity standard. It has been made a part of their State or city mandates, and so we have a real chance here to do something.

Actually, 12 years ago, Henry Waxman and I, over in the House, we were able to pass a clean energy standard. It was blocked in the Senate after it passed in the House, but still,

cities and towns have stepped up, as you said, and they put their own clean energy standards on the books.

So, Mr. Fowke, if you could, do you believe a clean energy standard can bring the business certainty necessary to provide reliable and affordable power to your customers while, at the same time encouraging clean energy innovation?

Mr. Fowke. I do. I think a well-designed clean energy standard is the right approach to climate policy. Clearly, details matter. But if we can design one that does recognize the need for natural gas as a bridge fuel and the value of carbon-free nuclear, if we have guardrails on reliability and cost and timeframes that are pragmatic, and combine that with more funding for those technologies that get that last bit of carbon off the grid, I think it is the right way to go.

Xcel has supported some of the proposed legislation out there, and I don't think my industry is far behind, in general, in supporting that approach.

Senator Markey. Thank you. Again, the Obama Administration propounded and put in place a clean power standard, which was going to be a 32 percent reduction in greenhouse gases by 2030. Even though the Trump Administration took that standard off the books, the utility industry has already met that standard here in 2021 that was the Obama standard in 2030.

So we can see that there is an enormous amount of momentum in this clean energy sector. But it is important for us to ensure, that, again, we set the standards high and that the industry knows exactly what they are going to have to do to meet those standards.

Mayor Garcetti, one of the questions which is constantly asked is, can renewables be reliable? Can you create a grid that is reliable? I know that, for example, Iowa is the fourth or fifth most reliable grid, and they have 42 percent of their electric generation comes from wind.

So tell us the story of, if you would, LA, and your goals for renewables and energy efficiency, and the reliability that you are simultaneously building into the system.

Mayor Garcetti. Absolutely. Good to see you, Senator Markey. It was great to see you out in Los Angeles.

To your last question, by the way, one in three Americans live already in a city or State with a 100 percent target, so it is time to make that law. Set a target, inspire the investment.

In Los Angeles, yes. Not only do we have greener power, cheaper power, and more reliable power, and the stats bear that out. The average American has about two hours of power that is out. In Los Angeles, we are about 15 percent less than that. Other States, it is much larger.

In the State of West Virginia, I know it is eight hours, on

average. We have a reliable standard; we have a reliable network, and that diversity comes from careful engineering. We have distributed solar in our basin, which is much more reliable when transmission lines cut off for any reason of extreme weather. We are able to meet, also, with demand response, something that I think a build back better plan should also invest in the technology behind that demand response, as well, so our renewables are very diverse.

We have been able to keep that reliability. We are cheaper than any of our peer utilities in the area. We are greener at 40 percent. We are as reliable today, and by the way, our bills, when I say cheaper, if we were a State, we would be the tenth cheapest of all of the States. So we are in the top quintile in terms of what people actually pay on their electricity bills and enjoying a greater reliability than other places with 40 percent renewable already accounting.

Senator Markey. Could I ask you one quick additional question? A national climate bank would be something that could be used to help the financing for sustainable projects for clean energy projects. It has already passed the House of Representatives a number of times in the last couple of years.

Senator Van Hollen and I have the identical bill over here in the Senate. What is your view of a national climate bank, Mr. Mayor?

Mayor Garcetti. A strong proponent of it, as planet mayors are across the Country. Sometimes, in cities like mine, we have a large entity. We have a lot of capital we can attract, but a lot of places don't, and we can accelerate what we are doing even in Los Angeles with this.

So I think this would be exactly what we need to not only bring resources forward, but to have the sort of innovation. A lot of people are scared to take that jump forward. Every time we have set the renewable standard in our State, it has been a fight. But every single time we have hit it, we have hit it early.

So I think this is something that a bank can help us get to everywhere, especially in some of our rural areas, some of our smaller cities, some of our smaller grids as well as large places like Los Angeles.

Senator Markey. Thank you, Mr. Mayor. Thank you for your leadership. LA is the model that the rest of the Country can be. Thank for your great leadership.

Mayor Garcetti. Thank you, Senator. I appreciate it.

Senator Carper. Senator Markey, thanks for joining us. Thanks for your questions.

Before we turn to Senator Lummis, I am going to ask unanimous consent to submit for the record reports and articles related to the National Environmental Policy Act, NEPA, which

show that NEPA is not a primary cause of federal infrastructure project delays. I also ask unanimous consent to submit for the record three letters, one from the Western Governors Association, one from State Attorneys Generals, and one from State water and wetland organizations opposing Trump EPA's efforts to weaken State authorities to use Federal permits under the Clean Water Act.

The letter from the Western Governors Association explains that curtailing or reducing State authority under the Clean Water Act, Section 401 with the wider role of States in maintaining water quality within their boundaries would inflict serious harm to State and federal authorities established by Congress, without objection.

[The referenced information follows:]

Senator Carper. Looking at the lineup coming ahead, after Senator Markey, we have Senator Lummis, and it looks like Senator Merkley, and Senator Boozman, in that order. Senator Lummis, Senator Merkley, and Senator Boozman, in that order. Senator Lummis?

Senator Lummis. Thank you, Mr. Chairman. Would it be all right if I allowed Senator Sullivan to go ahead of me? He has been waiting for quite some time.

Senator Carper. It would not be all right. I would object to that.

[Laughter.]

Senator Carper. Maybe in the Marine Corps. We are the same, we are brothers. That would be fine. It is very kind of you to do that.

Senator Sullivan, you are on. Colonel.

Senator Sullivan. Thank you, Senator Lummis. Thank you very much. I appreciate the Chairman's and Senator Lummis's help here. We all have a lot of hearings to go to, so thanks very much.

Like Senator Markey, I am an all-of-the-above energy guy myself, but one of the elements of the mix that now all of a sudden seems out of the mix is natural gas. So I want to talk a little bit about natural gas. This is actually important because the United States reduced greenhouse gas emissions from

2005 to 2017 by almost 15 percent, more than any other major economy in the world by far. It is not even close, and the main reason we did that was because of natural gas.

Yet, we seem to be losing sight of the power of that good jobs, clean energy, reliable energy in the mix with renewables and others. So I think it is important to recognize, these are a couple quotes I am going to give from people, until recently, who were for natural gas. The United States and North America, Mexico and the United States and Canada, will be the energy epicenter for the 21st century in part because of our abundance of natural gas. Who said that? 2016, Vice President Joe Biden.

We need an energy strategy for the future, an all-of-the-above energy strategy for the 21st century that develops every source of American-made energy, including natural gas. Who said that? Barack Obama.

How about this one? This is a shocker. Responsible development of natural gas is an important part of our work to curb climate change and support a robust clean energy market at home. Who said that? Gina McCarthy. Okay?

Now, we have on good sources, it is in the press, recently, President Biden said, I am "all-in on natural gas." That is the President, recently, in a meeting with a bunch of union leaders.

John Kerry is against natural gas. I won't read you all the quotes. We got the President of the United States for

natural gas, the President of the World, I guess, is his title, is against it, John Kerry.

So I want to first just get from the witnesses the importance of natural gas and whether they see it as an important element of the energy mix, good jobs, and helping us reduce greenhouse gas emissions. Let me just go down the list here. Ms. Snyder, do you think it should be an important part of our mix, like Gina McCarthy did a couple years ago?

Ms. Snyder. Absolutely. We view natural gas as foundational to our energy system, and that it will play a key role in addressing climate change. As you noted, it not only enables CO2 emissions reductions in the power sector and across America, but it also helps drive down emission globally.

Here, as far as the sector that we represent, the interstate natural gas pipelines, between 2011 and 2019, the average methane emissions from our compressor stations went down by 31 percent. So we are making great strides to drive down our methane emissions.

But even in spite of that, in 2018, we adopted voluntary methane commitments, because we were concerned about the lack of regulatory clarity and certainty. There was a lot of flip-flopping going on around that time, and we felt it very necessary to have some certainty, at least within our particular sector.

We recently went further in January of this year and committed to working together as an industry to achieve net-zero greenhouse gas emissions by 2050 from the interstate natural gas system. We think it is important to expand the availability of natural gas to complement the growth of renewable fuels and also deliver lower-carbon fuels.

Senator Sullivan. Thank you, Ms. Snyder.

Real quick, Mr. Wood, to build back better, are you as President Biden, who is all-in on natural gas, or John Kerry, who I guess is against his boss and against natural gas?

Mr. Wood. I live in West Virginia. We live over an ocean of natural gas in the Marcellus and Utica shale formations, so I am all-in on it. The thing we all know that hasn't been mentioned yet, that natural gas has only about half the amount of carbon in it that coal does. So every megawatt that we produce from natural gas removes half the carbon that we produce with coal.

Senator Sullivan. Just for my final three witnesses, we are talking about building back better, infrastructure, I think natural gas needs to be a key part of it. Mr. Rusco, Mr. Mayor Garcetti, Mr. Fowke, are you with the President, all-in on natural gas, or are you with John Kerry, who evidently is against it, and hasn't really explained why?

Mr. Rusco. Natural gas has been growing in large part

because it has been cheaper than coal. It has been displacing coal and nuclear, and it is definitely growing, and it is an important part.

Senator Sullivan. Great, thank you.

Mr. Mayor?

Mayor Garcetti. It is not a question of if, it is when we will get off natural gas, and don't take my word for it. Here at National Renewable Energy Labs, precisely for our utility, is to look at whether we can go to renewable without depending on natural gas. It shows that you can't.

Senator Sullivan. So are you with all-in, with the President?

Mayor Garcetti. I think all of us will get to a place where we move beyond natural gas. Everybody has said that. Everybody has talked about that transition; it is just a matter of how much time.

We should think about turbines, not natural gas. Turbines can run on things like hydrogen, you can have a mix with natural gas as that transition occurs. That is something that I think will get us to zero emissions and still keep the reliability.

Senator Sullivan. Okay, Mr. Fowke. Real quick. I am sorry about the time; I just want to get his view.

Mr. Fowke. We need natural gas to hit important interim projects. We cannot run a grid today on 100 percent renewables

and battery. When I say grid, I mean the big grid. I am not talking about individual business or municipality or a community, the big grid that we are all connected to. We need natural gas.

Senator Sullivan. Great. I thank you, Mr. Chairman.

I know it is five to zero. Maybe the mayor was neutral, so we will call it four-zero-one, all-in on natural gas. Thank you.

Senator Carper. Okay. Yes, thanks so much.

Senator Lummis, back to you.

Senator Lummis. Thanks very much, Mr. Chairman.

My first question is for Mr. Wood. Last year, the USEIT Act was signed into law to support carbon utilization and direct air capture research, which is really an exciting area of research. It is going on right now in the Permian Basin in Texas, actually directly capturing carbon out of the air.

Are there other things our committee and Congress should be doing to support carbon capture utilization and sequestration technology?

Mr. Wood. One of the limitations right now is cost. It costs about \$50 a ton to remove carbon dioxide from an operating coal-fired power plant, so we need some research and technologies that can drop that. There are research activities that are taking place right now, but more money, more research

into reducing the cost.

The second thing is transmission. We in West Virginia don't have a lot of places that you can inject natural gas in the sub-surface, so we will have to transmit it to other places. That means pipelines. That means permits, and so those two areas, I think, are areas that the government can help an awful lot in developing the transmission and capture of CO2.

Senator Lummis. Thanks, Mr. Wood.

You just segued into my next question. I know that Mayor Garcetti said in his written testimony, "We must streamline permitting processes through laser-focused agency coordination and accelerated environmental review." I couldn't agree more. I think that that is an important observation, and it is something government can do.

So, my question is for Ms. Snyder. Can you speak to the complicated process of navigating authorizations and permits for multiple Federal agencies, as well as State and local governments?

Ms. Snyder. Sure. It is quite a long and arduous process for our interstate pipeline. It is a multi-year process, in fact. In order to actually construct an interstate pipeline, you first have to conduct an environmental review; that is first and foremost. That is something that typically is conducted by FERC, but many different federal agencies are involved,

including the Army Corps of Engineers, the Fish and Wildlife Service, and others.

There are other factors that occur, such as States are often involved in taking a look at impacts to water quality. So there is a water quality certification as well, and some of our members have had issues in the past, where certain States are not listening to the explicit direction that Congress gave them and acting within a reasonable period of time, not to exceed one year from receipt of a request.

So, we really need to make sure that everyone is acting in a timely fashion, streamlined, not duplicating effort, and trying to ensure that these decisions are happening in a timely manner. It is very important for our industry in particular, because our projects are completely funded by private capital.

Senator Lummis. Switching gears just a little bit, Ms. Snyder, how does natural gas infrastructure support the development of renewable energy?

Ms. Snyder. Natural gas infrastructure is foundational to our energy system, and it really does complement renewables quite well, because it is extremely reliable. As we looked at a date from a 10-year period, our members were able to meet their firm contractual commitments 99.79 percent of the time. So natural gas can be available to support renewable energy sources at times when they are not available.

Senator Lummis. Mr. Chairman, thank you. I yield back.

Senator Carper. Thanks, Senator Lummis. I believe next in line is Senator Merkley by WebEx, followed by Senator Boozman, Senator Kelly, and finally, not last, but least, Senator Padilla.

Senator Merkley, you are up. Thanks.

Senator Merkley. Thank you very much, Senator. I am joining you now.

This winter, a lot of Oregonians lost power as a result of climate-intensified extreme weather. Last summer, we had a lot of folks who lost power when, essentially, the windstorms knocked down power lines, which created fires, and then the fires were driven by the windstorms. We had a number of towns in Oregon burn to the ground.

You couldn't imagine going through those towns. I travelled 600 miles around Oregon, north to south and back north again, and never got out of the smoke. It felt like Armageddon. To see those entire towns disappear, nothing but a little bit of plumbing hanging up, it was just something I never expected to witness.

So, the towns are very interested in how they harden their infrastructure, their electric infrastructure. Today I am introducing the Disaster-Safe Power Grid Act of 2020, in partnership with Senator Wyden, and it prints a matching grant

program to incentivize utilities to do some of the hardening of the electrical infrastructure in places that are high cost. Sometimes, that includes moving the wires underground where you are in an area prone to high winds and trees falling on the lines and knocking them down.

So I just would ask Mr. Rusco and Mr. Garcetti whether having a matching grant program might be helpful, because I know California has certainly suffered from some of the same effects.

Mr. Rusco. Yes, I think so. There is no question that the costs of making the electricity grid more resilient are going to be high. It is going to require a whole of government and a whole society effort to make the right decisions and to do it in the right way.

Mayor Garcetti. Okay. And yes, Senator, absolutely. We would run towards that. We would bring our capital towards that, and we would embrace that in a minute.

Senator Merkley. Great. Thank you.

Mr. Garcetti, Los Angeles has benefitted from distributed solar programs, so if you had resistance from public utilities that really, they don't really love the idea of people generating their own electricity, and if you have had that sort of resistance, how have you overcome it?

Mayor Garcetti. Luckily, we are in charge of the same utility. We directly oversee it, so they got to do what we say,

but they have absolutely embraced it. Embraced it for reliability, first and foremost, as I mentioned, during the fires, the Salt Ridge Fire, we almost lost our transmission lines. Three of them had to be shut down that come from outside the city, and we came within an inch of some rolling blackouts.

It was really distributed solar, and we have been the number one solar city in America five out of the last seven years, that saved us. It is complex; you have to rewire your city; you have to have storage. We do have massive out-of-basin solar generation too, but having it in-basin, putting veterans to work and low-income communities, putting that on rooftops, has been a great thing for our economy, great thing for our resilience as well.

Senator Merkley. So, we are going to be having a build back better infrastructure bill. Should a program to do, kind of copy the LA program for moving a lot more rooftop solar across America be something that would help really expand a renewable energy infrastructure?

Mayor Garcetti. No question. I mean, these are actually jobs that do produce a lot of work, and it is a relatively lower skill, but a great entrance into becoming an electrician, earning a lot of money. We would welcome that in an infrastructure bill. We would put our community colleges, as we already do, to work training those folks, and we have seen a

huge industry blossom here, and it is really not what people think.

It is not some liberal lefties and Democrats, like I said. It is veterans, it is Republicans, it is people who see the power of solar to really be able to have our own destiny in our own hands as an important part of this mix, and cheaper now than fossil fuel plants when we do that out-of-basin.

Senator Merkley. You mentioned storage, and of course one way to address a demand-supply balance is the ability to pull energy from other regions and balance things out. But you mentioned storage. What is the primary means of energy storage you are using?

Mayor Garcetti. Well, we are looking at three. One is in Utah, where we have the Intermountain Plant, which will be turbine-run, initially natural gas, but with hydrogen in that mix. Hydrogen, probably over some time, if we can make that work. We have ten different equivalents of the Empire State Building salt caverns underneath that plant, and we are looking at whether we can store hydrogen in there.

We are using water storage, Hoover Dam. When we have extra wind and solar, pump it back up, and use that as a water battery, essentially. And then of course, your more conventional batteries that Eland built, largest generation storage solar plant in America. We are building that right now,

and it is enough to power for about three days 286,000 households.

Senator Merkley. Do you have automated demand adjustment, as well? For example, a way to turn down people's air conditioners by a degree or two?

Mayor Garcetti. Not yet, but we are looking at the jobs, and the infrastructure bill could really help us here. We have to install our smart meters in cross. We are going to try to do it in the next 18 months to 24 months. We are looking at hundreds of jobs, again, for Americans out of work right now. That would be a great way to have an energy core across the United States and help with this just transition.

Senator Merkley. Mr. Fowke, let me turn to you. I think that Xcel Energy has been quite interested in small modular reactors. There is a company that initially started in Oregon, NuScale, that is one of the companies that is pursuing this. Are you interested enough that you are heading towards actual financing of a small nuclear operation?

Mr. Fowke. No, Senator. We are focused on relicensing our existing fleets at this point. I think the technology needs to continue to be developed and then deployed, and then we potentially would be interested in it. Obviously, we need to work with our State regulators, but right now, I definitely need to preserve my existing nuclear fleet.

Senator Merkley. I am recalling that you put out a request for proposals, maybe it was over a year ago now, maybe it was two years ago, time flies, but it had stunningly low cost for solar and wind. I think solar was lower by a cent per kilowatt hour, but you were also requesting storage as part of the bid.

Has that project that you were putting out there, is that now in construction, and did it turn out to be as inexpensive as it appeared from the bids that were submitted?

Senator Carper. Senator Merkley, I am going to ask, you are about a minute and a half over your time. Would it be all right if we could just have that question, it was a good question, have that answered for the record, please, so we can get through the rest of our folks who haven't had a chance to ask any questions.

Mr. Fowke. Yes, those prices were real.

Senator Merkley. Thank you.

Senator Carper. Okay. Thank you. Thanks so much.

Senator Boozman, by WebEx. Are you there?

Senator Boozman. Yes, Chairman. I am here.

Senator Carper. Welcome. You are recognized.

Senator Boozman. Well, thank you so much, Senator Carper and Senator Capito, for having this hearing.

As always, I think we have a really good panel and are getting a lot of good information. Ms. Snyder, low-income

families and communities spend a larger share of their budget on energy costs compared to middle-income families and upper middle-income.

We especially see this, I think, in rural America. Probably 50 percent of the counties in Arkansas will lose population as a result of the census, so we are having problems there anyway.

Tell me again, in my opinion, when you look at environmental regulations that increase energy costs significantly, and you are talking about a regressive tax, do you agree that increased energy costs have a disproportionate impact on low-income families, and particularly, an impact on rural America that does so much travelling for everyday basic necessities?

Ms. Snyder. Yes, I think affordability of our energy system is extremely important for low-income communities, and also those rural communities, as well as small businesses. We do need to keep in mind that around one-third of the generation of electricity in the Country is from natural gas. Natural gas has been helping keep our energy very affordable, and I think that this is something that we have to think about as we move forward and look to moving America towards a clean energy future is having it be affordable at the same time and not having disproportionate impact.

Senator Boozman. Very good. Thank you.

Ms. Snyder, there's a bipartisan agreement that Congress and the administration should make increased Federal investment in infrastructure. That is something that we can be very proud of on the EPW committee that really has just been a great example in that regard.

Unfortunately, such investment is sometimes hindered by duplicative and complex permitting processes. In recent years, Congress and the previous administrations, both Republican and Democrat, have made changes to the permitting process to increase efficiency without lessening environmental protections. A great example of that would be the rebuilding of the bridge in Minnesota that fell down. That was done in a year. Normally, that would take probably 10 or 15 years.

Would you agree that projects which are drawn out due to regulatory burdens have a hand in making our infrastructure projects more expensive? Why is a quicker, more efficient permitting process a good thing for smaller, more rural States like Arkansas?

Ms. Snyder. Yes. I think that it is very important to have an efficient environmental review and permitting process. This is not about trying to shortchange the review that is undergoing; it is just trying to make sure that agencies are working together, collaborating, sharing information, avoiding

duplication of effort, and also sticking to a timeline. This is very important to us.

I mentioned those rural communities, and little bit more disadvantaged communities so that they can get the infrastructure that they need. We think that it is very important to expand the availability of natural gas throughout the Country so that people do have affordable energy.

Senator Boozman. Very good. Again, I agree totally. Not cutting corners, but sticking to a timeline, getting the agencies to work together, so thank you, Mr. Chairman, very much, and thanks to the panel for a very, very good discussion.

Senator Carper. Senator Boozman, you are good to join us. Thanks for your questions.

We have two new members of our committee, Senator Kelly, and Senator Padilla. Senator Padilla, you have been very patient. Thank you for that. Senator Kelly, you are recognized, and if no one else shows up, Senator Padilla, you will be up. Go ahead, Senator Kelly.

Senator Kelly. Thank you, Mr. Chairman.

Mr. Rusco, in your testimony, you noted that climate change and drought can overwhelm hydro-power generation. During last year's extreme heat wave in California, energy from the Hoover Dam and Parker-Davis Dam destined for Arizona customers was called upon to help keep the California grid from completely

crashing.

Do you think DOE and FERC are prepared for a scenario where water levels get so low in the Colorado River that hydro-power wouldn't be able to sustain California, Arizona, or other western States during an extreme and prolonged heat wave?

Mr. Rusco. No, I think DOE and FERC have work to do in this regard, for sure. FERC has, as it has been mentioned, had dockets on energy resilience, and they have come to no conclusions, but they are opening a new docket in light of the recent events in Texas. They really do need to understand that the system is going to be stressed going forward, and they are going to have to figure out how to regulate it, to improve that.

Senator Kelly. How important are hydropower and nuclear in situations where the electrical grid needs an external power source to recover from a total shutdown?

Mr. Rusco. Definitely, hydropower is probably the best source for a black start or a quick return to power, and so if the whole system goes down, you are going to need to restart it. You need something that can turn on, and hydropower plays that role, and then you are going to need pretty much all sources to keep it up.

Senator Kelly. Thank you.

Mayor Garcetti, good to see you, Mayor.

Mayor Garcetti. Good to see you, too.

Senator Kelly. As you know, for many low-income families, keeping the air conditioning running during a heat wave is often a struggle, and the Federal Government offers grants to homeowners such as the Low-Income Housing Energy Assistance Program, LIHEAP. But that program was originally designed to help non-western communities save on oil heating costs in the winter.

Would you agree that climate change has put us on a path where LIHEAP funding may need to be realigned for disadvantaged communities in the south and the west due to extreme heat and drought?

Mayor Garcetti. I very much would, Senator. My family, my dad's side all comes from Arizona, from Superior, and from Phoenix, emigrated there from Mexico, and we know what that heat is like when I talk to my cousins. We know what it is like in Los Angeles, where this wasn't the hottest year of the last 100, it is going to be the coolest of the next 100.

So, absolutely, and I think one concrete thing you could do would be, affordable housing efficiency standards could be established through an efficiency metric for the low-income housing tax credit. So as you look at an infrastructure bill, put that in there.

We should look at also existing weatherization programs, too. They could be expanded for our low-income families, and

also incentivize, for instance, that they go to support fossil fuel-free appliances. These things will help lower bills, these things will help us, obviously, with the climate change emergency that we find ourselves in, but absolutely will help keep those bills low and contribute to cooler homes.

Senator Kelly. Well, thank you.

A follow-up, just a quick comment on Senator Merkley's questions about being able to control smart thermostats from the power company. That is something we have now in Arizona, and I think has been used on a number of occasions when it was both extremely hot in Arizona, but also in California, where we often have to try to get some additional help in our summer months. So it has been a success in Arizona, and hopefully it will be something that will be used more in other western States.

Thank you, and I yield back.

Senator Carper. Senator Kelly, thank you so much.

Senator Padilla, you have been here as long as I have today, and Senator Capito, and I am happy to yield to you for your questions.

Senator Padilla. Thank you, Mr. Chair.

Senator Carper. Thank you for bringing the Mayor of Los Angeles with you.

Senator Padilla. Absolutely. He said, anytime. Let's have him here often.

One of the challenges of being at the other end of seniority is thinking of what else to offer, value added to a hearing like this, that hasn't been raised already. I know we have covered a lot of important and timely issues as it relates to build back better, the theme, the focus of this hearing. I agree it is time to build back better, but not just build back, build back smarter, build back greener, build back more sustainably to address a lot of big issues.

So I am just going to share some thoughts here, and I will end with a comment and solicit a response from Mayor Garcetti and the other witnesses. I think we all do agree on a bipartisan basis, that we need to build back to address a lot of deferred maintenance issues when it comes to infrastructure across America.

Several members of the committee have touched on the need to be mindful of reliability of our electrical sector as we are building back and building back better. For those of us, especially those of us that have served at the municipal level and even at the State level, we are very well aware of the need to avoid great shock, right? We know that costs, over time, go up, whether it is infrastructure or fuels, et cetera.

But ratepayer impacts, both residential and commercial, are also an important concern to include in our deliberations. And we have additional challenges nowadays that are absolutely

undeniable challenges posed by climate change, whether you call it climate change or concerns about adaptation or any other term, they are real.

Add consideration for resiliency, separate and apart from the reliability questions and concerns that have been raised. So there are a lot of policy considerations to consider all at once as we will be working together to further define what build back better means. We need to address the resiliency given extreme weather that is impacting every region of the Country in different ways, let alone natural disasters. Sometimes they are related, sometimes not related at all to changing climate.

Again, being mindful of the impacts of rates versus bills. We got into that conversation, where California, for example, may have per energy calculation, slightly higher rates, but the energy bills that are arriving every month for customers to pay still remain in the lower half of the Nation's energy bills.

We are going to be working together. One thing I will invite us all to consider is the impact of some of the policies that may not have been within the four corners of the subject matter today, but do relate into our planning and investments in the trade, in the industry. It is known as integrated resource plan.

So we do talk about power plans and generation, multiple sources of it, is it coal, is it natural gas, want to wean off

fossil fuels, in my opinion, go more in the renewable direction. California has shown that you can do that aggressively, and the sky does not fall.

We will be talking about transmission and distribution infrastructure as part of build back better, and I want to make sure that includes conversation and consideration about smart grid deployment. Every utility in California is required to have a smart grid deployment plan, not just smart meters, but an actual, comprehensive smart grid.

But there is another piece that I want to raise for consideration. That is the topic of energy efficiency, right? Energy efficiency is an important tool in an integrated resource plan that helps address demands, site management. It should be considered as one of the most cost-effective measures when it comes to supplies tech management and is achieving important emission reductions.

I would love to hear from the witnesses any comments or feedback on those elements, in addition to job creation opportunities that energy efficiency provides, whether it is energy audits in the residential, commercial, even industrial sector, installation, retrofit facilities, et cetera. So that is my best effort, Mr. Chairman, to add something of additional value for consideration in today's hearing.

I invite the witnesses to respond or comment if they might,

and Mr. Chairman, with that, thank you very much.

Senator Carper. Senator Padilla, the vote has started on the Senate Floor, as you probably know. We are about 10 minutes into that vote.

What I am going to ask, if you are okay with it, is that our witnesses -- is there anyone you want especially to comment verbally? The others, I am just going to ask to respond for the record, so that we can recognize Senator Capito again and we will wrap it up. But is there anybody especially you want to just, go to, one witness?

Senator Padilla. Let's go to my friend, Mayor Garcetti. If he chooses for the record that is okay with me.

Senator Carper. Mayor Garcetti?

Mayor Garcetti. How generous you have been. Absolutely, Senator Padilla. Thank you.

This is about jobs. I would just say, read the LA100 Report. It was written not by my level of government, but yours. It shows that we can do this.

Second, think big, and think jobs, and think speedy. I think that is something that brought everybody here together. Think about the transportation engineers that we want in America, not in other countries. Think about the manufacturing we want in America and not someplace else. Think about the building trades, as they are part of building this out.

And to your point, it is not just what we build, Senator Padilla, it is what we don't build, and we save energy. That saves our planet, and I will end on this: there is a ten-alarm fire going off, and it is called this climate emergency. What I love hearing across partisan lines today is, it is not a matter if we transition, it is when.

Let's show America we can do it quick, we can do it well, we can do it safely and reliably, and we can do it in our lifetimes, so we leave something better for our children behind. Thank you so much.

Senator Carper. Yes. Senator Padilla, thanks so much.

Let me yield again to Senator Capito for any closing comments or questions she has.

Senator Capito. I just want to thank the witnesses. I want to thank the Chairman as well. As I refer back to my opening statement, I see there is a thread that is gone through this. A lot of different themes, but certainly the reliability and affordability issue is extremely important as we look toward the future, so thank you, Mr. Chair.

Senator Carper. Thanks so much. I just want to say, you may have to run to go vote. I am going to stay for a few more minutes. Thank you to you, to our staffs, and for helping us pull together, really, a terrific panel and make it possible to have this excellent discussion.

I have a couple quick questions that I am going to ask for just brief responses. First, Mr. Rusco. Does GAO have a view on whether current siting and permitting decisions for our Nation's energy infrastructure adequately factor in climate change? Mr. Rusco?

Mr. Rusco. In general, no, they have not. There was a recommendation way back in 2013 by GAO that NEPA should include climate risks as part of its consideration, and that is currently not the case.

Senator Carper. All right, thank you. One question I would ask for Mayor Garcetti to share with Ben Fowke, and that is with respect to clean energy targets. Mayor and Mr. Fowke, you both discussed ambitious clean energy targets for your respective city and company. In both testimonies, I heard that the path to lowering electric sector emissions by 80 to 85 percent is fairly certain, based on the technologies that we have today. It is the last 15 to 20 percent emissions that are going to be more difficult to reduce, based on today's technology.

Question: do you both agree that we have the technology available in this Country to reach 80 percent reductions of the greenhouse gas emissions across the electric sector in the next decade if this Country implemented the right federal incentives, investments, and regulatory structures? Do you both agree with

that? Just yes or no.

Mayor Garcetti. Yes.

Senator Carper. All right.

Mr. Fowke. I can't answer yes or no. We can do it at Xcel. It is going to be more difficult, way more difficult, in other areas of the Country, quite frankly.

Senator Carper. All right, thank you. Would a national clean emissions or clean energy standard for the electricity sector help drive innovation and deployment of clean energy?

Mr. Fowke. Yes.

Mayor Garcetti. Yes, it would.

Senator Carper. All right, good.

Wrapping up, I love to wrap up a discussion like this by asking the diverse panel of excellent panelists we have been blessed with today to maybe share with us a closing thought, and what you heard today that demonstrates the areas of agreement on the views that you shared with us, and agreement on the actions of the Federal Government should take to support a clean and resilient electricity sector in this Country.

So, looking for consensus here, as we close out. I am going to just say, one of my colleagues, in fact, the guy who often sits to my left here on this committee, says I am the most persistently optimistic person that he knows. My wife thinks I am too optimistic, I have got to be more realistic, but I am too

old to change.

I say everywhere, I quote almost every day of my life, the words of Einstein, who use to say, "in adversity, lies opportunity," and I have lived it. When I was a Naval flight officer in a very unpopular war in Southeast Asia, I would never have imagined I would come back years later as a congressman to work with John McCain, John Kerry, and a bunch of my colleagues in the House of Representatives, to normalize relations with Vietnam.

When I was 29, I got elected to be State Treasurer of the State that had the worst credit rating in the Country. I couldn't balance their budgets for nothing. I had no cash management, I had no pension system, and we were just dogmeat when it came to running our economy and our finances.

We ended up with a triple-A credit rating; still have it today, and a strong economy. I know from personal experience, in adversity, lies opportunity, and we continue to face huge adversity with respect to extreme weather events, but there's opportunity here as well.

I just want each of you to take no more than 60 seconds, something that you heard today, maybe said today, or you think demonstrates areas of agreement for the members of this panel, and really, for those of us with whom we serve to support a clean and resilient electricity sector in this Country. Let me

see who we will start off with to close out. Hold on. Okay.  
Mayor, you go first, please.

Mayor Garcetti. Thank you so much, Senator.

First, I would say, there was so much common ground, whether or not it was to be with all of my fellow panelists. One is, I will repeat what I said, the transition is coming. It is not a matter of it, but when.

Second, Federal Government, be there more when we need you, and get out of the way when we don't. So, be there for a national, maybe transportation innovation institute, jobs consortium, but help those regulations and get us to build these things quicker.

Third, diversity is critical in our energy supply, but remember that renewables are diverse. So it doesn't mean that that is just a code way of getting in the way we have done things before, and fourth, reduce as well as build. Reduce consumption, not just what we have built up.

Thanks again for the honor.

Senator Carper. Mayor, thank you so much. Frank Rusco, please, Frank, would you give us a wrap-up thought, please?

Mr. Rusco. Yes. Thank you. I agree that to be able to build back better, we have to be able to build, and there is room to improve the Federal permitting process and streamline it. There have been steps taken in the last two administrations

to do so, and I hope that we continue that effort to get agencies to work together, and efficiently, so that we can actually get the important infrastructure built to make our system resilient.

Senator Carper. Thank you, Frank.

Ben Fowke, please. Mr. Fowke?

Mr. Fowke. I think there is a lot of consensus that we can achieve remarkable carbon reductions over the next decade. It is going to vary region to region by geography. But we can do a lot.

My hope is that we don't make perfection the enemy of the good. We are going to need to preserve our nuclear fleet. We are going to need to preserve natural gas. We are going to need to keep our eye on the prize, which is carbon reduction in the most affordable, pragmatic way possible. We cannot sacrifice affordability and reliability. If our product stays affordable, we can electrify things like transport and do it economically.

Senator Carper. All right. Thanks so much.

Ms. Snyder, please?

Ms. Snyder. I would say that we are all agreeing here today that energy policy changes are necessary, and that really includes ensuring that we have permitting predictability as well as consistency in our regulations, so that we can build back better.

Second, I would say that we are all in agreement that there is going to be a need for new, innovative technologies. Having federal support and funding to progress those technologies is going to be critical.

Third, I would say that we all seem to be saying that natural gas is key to complementing the growth of renewables and ensuring reliability.

Senator Carper. Thanks so much.

I am going to come back to you with a question for the record, Ms. Snyder. It relates to natural gas. Could the building of coal-fired plants in other places around the world to provide electricity in places like China and India, and to see what kind of opportunities there are for us to provide natural gas for them as a bridge fuel, so they don't build more coal-fired plants? Mr. Wood, please.

Mr. Wood. Well, I agree with Ms. Snyder. I think affordability, good reliability, reduction of carbon, are our consensus in here. We also have an example of a city that has done a lot of good, and it is something that we can use as a model.

Senator Carper. Mr. Wood, I was distracted for a moment. Just repeat again what you said. I apologize.

Mr. Wood. Okay. I said I agree with Ms. Snyder on her comments, and I think we agree as a panel on need for

affordability, diversity of source, good reliability. We haven't mentioned it often, but I think we ought to keep cyber security in mind, and the reduction of carbon.

Senator Carper. All right. Thank you. Is Gordon Gee still your President at West Virginia University?

Mr. Wood. Yes, he is.

Senator Carper. He has been president twice there, twice at Ohio State where I graduated from. Vanderbilt, Brown, maybe a school in Colorado. When you see him, would you tell him a West Virginia native from Beckley, West Virginia sends his best, okay?

Mr. Wood. Well, I hope he is watching.

Senator Carper. We hope to maybe put together a symposium with the help of the folks at Aspen Institute to come to West Virginia in late spring to focus on how do we make sure that we don't leave folks behind whose jobs have disappeared or are disappearing. We look forward to maybe having the chance to do a few things. Give him our best, please.

I have, it looks like a catch-all unanimous consent to place all materials into the record, and I ask unanimous consent to submit for the record a number of reports and articles focused on the need to reduce greenhouse gas emissions in the electricity sector while improving the resiliency and reliability of our power grid. If I have already said that

before, please bear with me.

[The referenced information follows:]

Senator Carper. Now, in closing, I want to thank our witnesses. This has been an extraordinary panel, and just a wonderful time of sharing, and is a time of creation of a lot more consensus than some people would have imagined on a really important subject.

Our panel has included the leader of one of our largest cities, a nonpartisan expert in industry stakeholders. Hearing each of their perspectives shows the complexity of the challenges ahead on this critical issue.

But after hearing from all of you today, what strikes me the most isn't the challenges, it is really the opportunities. The opportunity to put our Nation on the path to a safer and more prosperous future, the opportunity to create millions of good-paying jobs, the opportunity to build a strong and more innovative economy, the opportunity to clean our air and protect the environment for our children and our grandchildren.

It is the job of those of us and our Federal Government and the government at all levels to come together and make those opportunities a reality for the American people.

Again, I want to thank all of our witnesses for taking part of that process. I want to thank our colleagues. Almost everybody on the committee has joined us and been a part of this hearing. That is terrific.

I want to thank our staffs, especially, for pulling

together a great group of witnesses from across our Country.

Senators will be allowed to submit questions for the record through close of business on March, 24th. We will compile those questions and send them to our witnesses and ask that our witnesses reply to us by April the 7th. And with that, this hearing is adjourned. God bless.

[Whereupon, at 12:18 p.m., the hearing was adjourned.]