

HEARING ON PROMOTING AMERICAN LEADERSHIP IN REDUCING AIR
EMISSIONS THROUGH INNOVATION

Wednesday, November 15, 2017

United States Senate

Committee on Environment and Public Works

Washington, D.C.

The committee met, pursuant to notice, at 10:03 a.m. in room 406, Dirksen Senate Office Building, the Honorable John Barrasso [chairman of the committee] presiding.

Present: Senators Barrasso, Carper, Inhofe, Capito, Boozman, Fischer, Ernst, Whitehouse, Markey, and Harris.

STATEMENT OF THE HONORABLE JOHN BARRASSO, A UNITED STATES
SENATOR FROM THE STATE OF WYOMING

Senator Barrasso. Good morning. I call this hearing to order.

Today, we are here to discuss America's continued leadership in reducing air emissions.

The United States has always been a leader in reducing air pollution by supporting and allowing the private sector to find innovative ways to reduce emissions. In fact, since 2005, the United States has reduced its combustion-related carbon dioxide emissions more than any nation in the world. The development of innovative drilling methods has allowed domestic oil and gas producers to economically access natural gas, a low emitting fuel. Development of new technologies has consistently reduced our emissions, grown our energy, and improved how we use our resources.

Between 1970 and 2015, GDP grew by 246 percent, while emissions of particulate matter, ozone, lead, carbon monoxide, nitrogen dioxide, and sulfur dioxide, dropped by an average of 70 percent.

New technologies have improved how we use energy to reduce emissions.

Today, I am excited to hear about research at the University of Wyoming on similarly promising technologies that

will allow us to both continue reducing our emissions and use our natural resources.

The University of Wyoming School of Energy Resources was established by our State legislature in 2006 and it serves as a bridge between academia and industry. The school conducts applied research to develop innovative solutions to solve critical energy and environmental challenges faced by our Nation and the world. These technologies include carbon capture, utilization, and sequestration, which has already received bipartisan support from my colleagues on this Committee.

In addition to carbon capture, utilization, and sequestration, the University of Wyoming is exploring research related to advanced coal combustion, rare earth elements from coal and coal by-products, carbon engineering, and measurements of methane and volatile organic compounds emissions from oil and gas operations.

Significant innovation is also occurring in the manufacturing sector. American manufacturers are the most productive in the world due to their dedication to always improving efficiency. At the same time, American manufacturers, in their entirety, have a strong track record of reducing their environmental impact.

According to the National Association of Manufacturers, who is represented here today, greenhouse gas emissions from the

manufacturing sector has decreased by 10 percent over the past decade, while increasing their value to the economy by 19 percent.

During the last Administration, America moved away from an innovative approach and instead pursued a regulatory approach, which punished our businesses instead of supporting and collaborating with them. The last Administration's misguided policies included signing the U.S. up for the Paris Agreement, a deal that I thought was a bad deal; it would have stifled American growth.

I would like to introduce into the record the article published on the front page of yesterday's Washington Times entitled Emissions Report Casts Doubt on Paris Accord. The sub-headline is China Still Polluting as U.S. Cleans Air. China Still Polluting as U.S. Cleans Air.

Without objection, this will be admitted into the record.

[The referenced information follows:]

Senator Barrasso. The article explains that U.S. greenhouse gas emissions are projected to decline this year. Meanwhile, greenhouse gas emissions in China and India, signatories to the Paris Agreement, are projected to increase.

Today, we will also hear about how other policies are hindering the private sector's ability to innovate to the point where industry is abandoning investments in technologies to make environmental improvements. For example, New Source Review requirements under the Clean Air Act are discouraging businesses from retrofitting their existing facilities with equipment that would reduce emissions, as well as from making operational changes that would be more efficient.

President Trump has demonstrated a commitment to reducing these barriers to American businesses through his Executive Order promoting American energy independence and a presidential moratorium on reducing the regulatory barriers that domestic manufacturers face.

Today, I look forward to examining how we can provide American businesses the space to do what they do best, solve problems through innovative solutions.

I now turn to Ranking Member Carper, my friend and colleague on this Committee.

[The prepared statement of Senator Barrasso follows:]

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

Senator Carper. Thank you, Mr. Chairman.

To our witnesses, welcome. I told the Chairman this morning I was excited about today's hearing. This is one of those days and one of those issues around which I thought there would be a whole lot of consensus and agreement, and I am tempted to just go point by point to rebut half the things that he just said, but I don't want to rain on the parade. This is going to be a great hearing and we are delighted that you are here, and thrilled with the idea of putting a spotlight on the idea that we can have cleaner air, cleaner environment, cleaner water, and at the same time create jobs and have economic growth. They are not incompatible. In fact, they are most interdependent. So we will leave it at that. But we are grateful that you are all here.

It was Abraham Lincoln who famously said that the role of government is to do for the people what they cannot do for themselves. The role of government is to do for the people what they cannot do for themselves. And I think one of the most important jobs that the government has is to help create a nurturing environment for job creation and job preservation. People like us, presidents, governors, mayors, we don't create jobs. What we help to do, with the help of a lot of other folks

and a lot of key stakeholders, is we help create a nurturing environment for job creation, job preservation. We also have an obligation in the Government to protect our health, the health of our public, to ensure that all Americans can pursue life, liberty, and the pursuit of happiness. Luckily, the two are not mutually exclusive. In fact, history shows that cleaner air is also good for business.

Today, our Country is undergoing a clean energy revolution, and that did not happen by accident. Over the past eight years, starting with the Recovery Act, the Federal Government has provided economic incentives, environmental targets in the supported market to develop investment in the clean energy of the future. This carrot and stick approach resulted in more than \$507 billion of investment in the clean energy sector over the last decade and in our Country becoming a leader in exporting clean air and clean energy technologies. Thanks to these investments, consumers are paying less for energy, jobs are being created here at home to keep up with the demand for the products that these technologies enable. In 2016 alone, one out of every 50 new jobs added in the United States was created by the solar energy industry.

Today, we are going to hear from one of our witnesses about a particular manufacturing sector that has reaped the benefits of the past actions of our Federal Government, the automobile

industry. I would like to remind my colleagues how this sector has changed over the past decade. It is a story near and dear to my own heart, and I think a perfect example of how American innovation and economic opportunities can be driven by Federal investments and regulations, common-sense regulations.

Despite decades of Federal Government funding for advancements in automobile fuel efficiency technology, it wasn't until after Congress increased fuel economy standards in 2007 that consumers really started to see the benefits. The 2007 compromise crafted by our colleagues, including former Senators Ted Stevens, Diane Feinstein, Ed Markey, who is in and out of here today, and myself increased the fuel efficiency standards for cars and trucks and vans for the first time in 32 years. The 2007 light-duty vehicle efficiency targets were replaced by tighter efficiency targets and greenhouse gas emission limits in 2010, and again in 2012, with the support of major automobile, labor, environmental, health groups, and consumer groups. The results have been remarkable. You don't have to believe me; the numbers prove it.

Taken together, these car and light-duty truck standards are projected to almost double the fuel economy of cars and light duty trucks to 54.5 miles per gallon by 2025. These standards are reducing the amount of oil we import by 2 million barrels per day and will save American drivers nearly \$1.7

trillion in gasoline costs that they will no longer have to buy.

In even better news, these regulations have not been the job killer that many would have us believe. In fact, they have been quite the opposite. Automakers found that making more energy-efficient vehicles allowed American companies to better compete not just here at home, but overseas as well. Early implementation of these standards occurred during seven years of unprecedented growth in the auto industry and record sales last year, in 2016. The industry has also added roughly 700,000 direct auto sector jobs since 2009.

It is clear that we have made great gains in reducing emissions in our transportation and energy sectors over the past eight years, while still growing our economy. We have been doing something right. And although our air is cleaner today and our economy is strong, we still need to do more to protect public health and ensure that America remains a leader in the global economy.

Having said that, I fear that this Administration is taking us in the wrong direction in this arena walking away from the Paris Accord agreement, leaving the U.S. as the only country in the entire world that is not part of this historic agreement. And walking away from other climate and air protections is, I think, beyond irresponsible. And saying that you have to do so for the good of the American economy is just blatantly false.

In fact, scrapping forward-looking standards will only provide more uncertainty for businesses and threaten to stifle American innovation.

For me it is clear. This is not an either-or situation. In order for the United States to continue to be the world's leader in this new clean energy revolution, and we need to be, we need both Federal investment in technology and common-sense regulations.

So, thanks, Mr. Chairman, for holding this important hearing.

We are delighted that our witnesses are here. We look forward to a robust conversation with you all. Thank you.

[The prepared statement of Senator Carper follows:]

Senator Barrasso. Well, thank you, Senator Carper.

We will now hear from our witnesses, but before we turn to Kipp Coddington, let me first say a few words about him.

Mr. Coddington has a distinguished career as a chemical engineer and as an attorney. He has more than two decades of experience in helping fossil and renewable energy companies address some of their most challenging energy and environmental issues. At the University of Wyoming, Mr. Coddington oversees the Carbon Management Institute, which is striving to become a world-class center of technoeconomic and carbon management solutions by conducting applied research.

In addition to his duties at the University of Wyoming, Mr. Coddington is the former chair of the International Organization for Standardizations Committee that is in the process of drafting the first international technical standard for storage of carbon dioxide during enhanced oil recovery operations.

Before moving to my home State of Wyoming, Mr. Coddington practiced law here in Washington, D.C., and I am pleased that he now calls the great State of Wyoming home.

In addition to Mr. Coddington, we have Mr. Ross Eisenberg, who is Vice President of Energy and Resources Policy for the National Association of Manufacturers.

And also joining is today is Zoe Lipman, who is the Director of Vehicles and Advanced Transportation Program, the

BlueGreen Alliance.

I want to remind the witnesses that your full written testimony will be made part of the official hearing record today, so please keep your statements to five minutes so that we may have time for questions. I look forward to your testimony.

I would recommend, also, and remind you that your full written testimony will be made part of the official hearing today, so please keep your statements to five minutes.

Mr. Coddington, please begin.

STATEMENT OF KIPP CODDINGTON, SCHOOL OF ENERGY RESOURCES,
UNIVERSITY OF WYOMING

Mr. Coddington. Mr. Chairman and Senators, thank you for the opportunity to appear before you today to discuss research at the University of Wyoming related to reducing air emissions through the development of new technologies and efficient practices in manufacturing and energy production and use. I am the Director of Energy Policy and Economics at the School of Energy Resources at UW and also direct the Carbon Management Institute, which is one of SER's Centers of Excellence.

All the projects and research areas noted in my testimony are important so that the United States remains a leader in using its abundant energy resources with reduced impacts to air quality. These air issues also are important to Wyoming, which is one of the Nation's leading energy jurisdictions. According to the U.S. Energy Information Administration data for 2015, first, Wyoming produced 42 percent of all coal mined in the United States; second, 32 States received coal from Wyoming mines, with 10 States, including Wyoming, obtaining more than 90 percent of their domestic coal from Wyoming; third, Wyoming accounted for 6.2 percent of U.S. marketed natural gas production; and, fourth, almost 88 percent of net electricity generation in Wyoming came from coal and nearly 11 percent came from renewable energy resources, primarily wind.

Sitting in the Rocky Mountain west, Wyoming energy resources face a variety of environmental challenges and opportunities, from the State of California's enduring air and climate regulatory programs to fuel choices by Wyoming customers of Wyoming energy.

My written testimony provides a broad overview of UW's research, divided into the following topical areas: first, reducing atmospheric emissions of greenhouse gases and other constituents associated with the combustion of fossil fuels; secondly, utilizing carbon dioxide once it is combusted from the utilization of fossil fuels; and, third, not creating emissions in the first instance, which would include, for example, taking coal directly to beneficial products instead of combusting it for electricity.

My written remarks conclude with some brief observations about our policy work and ongoing engagements with regional stakeholders, such as Idaho National Lab.

With respect to topic area number one, reducing emissions from the combustion of fossil fuels, UW is working on numerous technologies, such as flameless pressurized oxyfuel combustion, coal-firing coal with biomass, and measurements of methane and volatile organic compound emissions from oil and gas operations.

With respect to topic area two, utilizing carbon dioxide once it is produced from the combustion of fossil fuels, the

State of Wyoming is an ideal jurisdiction to advance research and projects related to capturing and utilizing emissions of carbon dioxide. For example, led by the Wyoming Infrastructure Authority and with the support of many private and public sector entities in Wyoming, the Gillette-based Integrated Test Center will soon serve as an operational test site for CO2 capture technology developers and providers to evaluate carbon capture utilization and storage technologies using actual fuel gas from a coal-fired power plant. The ITC is also hosting the coal-track of the \$20 million NRG COSIA Carbon XPRIZE, a global competition to develop breakthrough technologies that convert CO2 emissions from fossil-fuel combustion into products with the highest net value.

It is also worth noting that Wyoming is one of only a handful of States with existing CO2 pipeline infrastructure, with ongoing efforts to expand the same under the Wyoming Pipeline Corridor Initiative. Wyoming also has an existing CO2-enhanced oil recovery industry and has enacted laws to encourage the environmentally responsible siting and operation of CCUS-related projects in the State.

My written testimony provides more details about the abundant work we are doing in the area of CO2 utilization.

Thirdly, the third research area I wanted to cover is advancing the utilization of coal in a non-combustion

environment. UW is alone in developing and advancing novel and innovative technologies related to the extraction and production of valuable non-Btu products from coal. The primary focus of this research is to advance coal utilization as a feedstock to manufacture and generate valuable non-Btu coal-related products such as carbon fiber and carbon-rich chemicals, agricultural and building products. And some of these products, for example, graphite and carbon fiber, are predicted to be in short supply as the demand for lightweight materials, renewable energy and the like grows in the years ahead.

Our work on Rare Earth Elements is also expanding. UW researchers, in collaboration with colleagues on campus and throughout the region, are separately investigating the identification, characterization, and separation of REEs from coal, coal by-products, and produced waters. Expansion of domestic sources of REEs remains a high priority for policymakers.

This concludes my verbal testimony. I commend the Committee for addressing the issue of the role that innovative technologies are playing in reducing air emissions. UW is doing its best to advance frontiers of these research areas for the benefit of a variety of stakeholders. The ongoing Federal role in supporting these research endeavors is imperative.

I would be pleased to answer any questions that you may

have. Thank you.

[The prepared statement of Mr. Coddington follows:]

Senator Barrasso. Thank you very much for your testimony,
Mr. Coddington. We will get to questions after we finish with
the rest of the panel.

Mr. Eisenberg, please proceed.

STATEMENT OF ROSS EISENBERG, VICE PRESIDENT, NATIONAL
ASSOCIATION OF MANUFACTURERS

Mr. Eisenberg. Good morning, Mr. Chairman, Ranking Member Carper, members of the Committee. My name is Ross Eisenberg. I am pleased to provide testimony on the wonderful, the very good things that manufacturers are doing to improve emissions in this Country and usher in a more sustainable environment.

Through a wide range of traditional and innovative measures, manufacturers have sharply reduced their emissions and have helped usher in this new era. Since 1990, the national pollution concentrations have, it is really a remarkable thing. All the trendlines on pretty much every single major pollutant have gone straight down. Carbon monoxide concentrations are down 77 percent; lead, 99 percent, nitrogen dioxide, 54 percent; ozone, 22 percent; coarse particulate matter, 39 percent; fine particulate matter, 37 percent; and sulfur dioxide, 81 percent.

As you said in your opening remarks, Mr. Chairman, we have reduced more greenhouse gases than any other nation on earth.

When you narrow this analysis to the industrial sector, you get similarly impressive results. Today's manufacturing company would like to say it is not your father's or even your grandfather's manufacturer; it is a sleek technology-driven operation that looks nothing like industrial facilities of the past. And with that progress has come a much smaller

environmental footprint. Industrial emissions of nitrogen oxide, which is a criteria pollutant and the main driver of ozone, they have dropped by 53 percent in the industrial sector since 1970. Industrial emissions of volatile organic compounds, VOCs, the other pollutant that makes up ozone, are down 47 percent during that same time frame. Carbon monoxide is down 70 percent in our sector since 1970. Sulfur dioxide, 90 percent. Emissions of coarse particulate matter in the industrial sector are 83 percent down since 1970; fine particulate matter, 23 percent since their peak in 1999. And on greenhouse gases, the industrial sector manufacturing actually emits less than we did in 1990. Just over the past decade, we have reduced our greenhouse gas emissions by 10 percent, while increasing our value of the economy by 19 percent in that same time frame.

So, across the board, manufacturers are truly walking the talk. My written statement provides a wealth of examples that were sent to me by our manufactures from companies like Olin, Xerox, Cummins, Johnson Controls, Owens Corning, Illinois Tool Works, and many others.

My testimony highlights Covestro, which committed to reduce its 2005 CO2 levels by 40 percent by 2020. They have already beaten that, so they set another target of cutting that in half by 2025.

The ASF's Huntsville, Alabama facility implemented

materials management and recycling activities that saved more than 1,500 metric tons of VOCs and 35,000 metric tons of CO₂.

Calgon Carbon, up in Pennsylvania, manufactures activated carbon products. They control mercury emissions from power plants, industrial boilers, and cement kilns.

The steel manufacturer ArcelorMittal installed a \$63 million energy recovery system that captures their off-gas, their blast furnace gas, and uses it, instead of it being wasted, to produce steam to generate electricity, which reduces their annual CO₂ emissions by 340,000 tons.

There are literally thousands more across the Country doing groundbreaking work to make themselves more sustainable, and they have names you know, like Hershey, and Subaru, and Clorox, and Pfizer; and names you might not know, like Nalco, FuelTech, L.S. Starrett. These companies are developing and installing technologies that reduce the emissions from reducing energy. They are making changes to their processes and they are reducing their emissions right there on the shop floor. They are developing these technologies with an eye towards exporting them around the world and helping others.

Now, there do remain barriers to accomplishing even more, but one I would like to focus on, as I do in my written statement, is New Source Review, a Federal air permitting program that applies to new facilities or major modifications.

In practice, NSR has become a barrier to efficiency upgrades and the installation of modern pollution control equipment. The ups and downs of NSR can result in years-long delays, high modeling costs, citizen suits and enforcement actions. And that is assuming you actually get the permit. Many simply just won't bother.

For instance, if a manufacturer installs selective catalytic reduction technology to reduce NOx emissions, the components can trigger NSR for that facility for all emissions, requiring a full comprehensive review. That is a lot of risk to shoulder for the installation of, really, just one component.

One manufacturer reports that customers have asked it to de-optimize performance in a suite of efficiency upgrades in order to avoid triggering NSR. And NSR notice of violation have been issued for environmentally beneficial projects like economizer replacement, steam turbine upgrades, feedwater heater replacements, and similar activities.

Even worse, NSR presents a very big impediment to the installation of the more efficient technologies that are going to be used to control climate change. In comments to the draft Clean Power Plan, the Utility Air Regulatory Group submitted an attachment that had 400 individual projects that would have increased the efficiency of power plants, only to be targeted by the EPA or citizen suits with NSR violations. That can't

possibly be what Congress intended when it set up this program.

So, the NAM urges this Committee to work closely with EPA to fix NSR so that it functions properly and doesn't stand in the way of efficiency.

Manufacturers have established a strong environmental protection record, and we strive to reduce the environmental footprint of our operations and become more sustainable. The results are already very impressive, and they get better with each passing year. However, as my testimony shows, barriers do still exist. The NAM hopes it can work with this Committee to reduce these barriers and help solve the environmental challenges of current and future generations.

Thank you.

[The prepared statement of Mr. Eisenberg follows:]

Senator Barrasso. Thank you very much, Mr. Eisenberg.

Ms. Lipman, thank you. Welcome to the Committee.

STATEMENT OF ZOE LIPMAN, DIRECTOR, BLUEGREEN ALLIANCE

Ms. Lipman. Thank you, Mr. Chairman and members of the Committee. Thank you for the opportunity to testify today. The BlueGreen Alliance unites America's largest labor unions and its most influential environmental organizations to solve today's environmental challenges in ways that create and maintain quality jobs and build a stronger, fairer economy. In our work, we see that the innovation being carried out by workers and companies across America to meet our pollution and climate challenges is not just important to the environment, but is a critical driver of American competitiveness and job growth.

Worldwide, the race is on to deliver better energy, transportation, and infrastructure that is efficient and lower emitting. The places that can meet these needs first, best, and can continue to do so into the future will have a powerful leg up in the future economy.

We share the enthusiasm of others on this panel around the innovation happening today in America both to build the technology that cuts air emissions and to improve the manufacturing processes to make them more efficient and lower polluting.

I want to talk today about what is needed to sustain this progress.

We support the Nation's invaluable network of national labs

and the critical energy and transportation technology programs at the Department of Energy that build on this expertise, and we underscore the critical importance of the agency's commercialization and manufacturing programs that help ensure we turn innovative technology into equally innovative, globally competitive manufacturing and jobs in America.

Thanks to efforts to improve the efficiency, emissions and energy competitiveness of America's most energy-intensive industry, some of which have been mentioned already today, America's steel and aluminum manufacturers, for example, are some of the cleanest, lowest emitting, and most productive in the world, while upholding good wages and high labor standards at the same time. Our tax, trade, and international agreements should help us support and defend the industrial leadership being shown by companies here, not undermine them.

But equally important to sustaining the innovation we are seeing today in cutting air emissions are sound, long-term, globally leading standards. A sound regulatory framework is critical to provide companies with the certainty necessary to make the large long-term investments in innovation at scale.

Regulations are working not just to cut air emissions, but to dramatically spur innovation, investment, and job growth. As proof, look no further than the car or truck in your driveway.

Over the past decade, the auto sector has been transformed,

as has already been mentioned; not just the car makers themselves, but the huge network of suppliers and manufacturing that is connected to them. Under the current fuel economy and vehicle greenhouse gas standards, not only has the industry achieved unprecedented cuts in emissions, but the industry has returned to profitability and growth, and has built great cars, SUVs, and pickup trucks that consumers have snapped up at record levels. Fuel efficiency gains are saving drivers of all kinds of vehicles billions of dollars a year, enhancing America's energy security, and underpinning a gradual recovery of U.S. manufacturing as a whole.

In June, we released a report of the Natural Resources Defense Council where we found over 1,200 factories and engineering facilities in 48 States and 335 congressional districts, and 288,000 workers building the specific technologies that go into improving fuel economy and cutting emissions in today's cars and trucks. This is two and a half times as many factories and engineering facilities, and almost twice as many workers as we found in a similar study in 2011. But even that impressive growth doesn't fully capture the recovery of a dynamic, innovative, far more competitive automotive manufacturing supply chain and industry.

Take, for example, the Ford F150. This is a very popular pickup truck, but it still only makes up a small percentage of

the vehicles on the road. Nonetheless, the fuel saved by just the new F150s built since the fuel economy standards began implementation in 2012 cut carbon emissions equivalent to the total electricity use of the City of Boston.

Achieving those gains required innovation not just in vehicle design and assembly, robotics, and training by Ford in Missouri and Michigan, but aluminum companies in Tennessee and Iowa, which developed and built new types of aluminum, aluminum treatment, and aluminum joining. Iowa and Indiana steel facilities developed and manufactured new lightweight, high-strength steel for the vehicle frame. Ford holds several hundred patents for parts of the truck's efficient EcoBoost engine and has made multiple rounds of retooling investment in the plants that build it. The company that makes the F150's efficient electric power steering faced bankruptcy in 2009, but today is the biggest employer in Saginaw County, Michigan.

Just these few examples represent billions in automaker and supplier investment, and likely hundreds of millions above and beyond business as usual. They represent real factory investments and jobs coming back to communities all across America.

We know what the tools are that have spurred this innovation; not just in transportation, but also in the energy and industrial sectors. Whether it is support for R&D and

technology development, for commercialization, manufacturing and workforce investment, or the clear regulatory framework necessary for companies to make these important investments in innovation. And we need to use them all to ensure that we invent the next generation of technology, build it here and build good jobs in America doing so.

Thank you very much, and I look forward to answering any questions you have.

[The prepared statement of Ms. Lipman follows:]

Senator Barrasso. Well, thank you very much to all three of you for this very interesting testimony. We will start with questioning. I will start with a question for Mr. Coddington.

It seems that many of the innovative technologies that are being applied by the private sector benefit from basic research and development conducted by the Federal Government and by our Nation's universities. This research has been especially beneficial when there is collaboration between industry, universities, government entities at both the State and the Federal level.

So, can you elaborate a little bit on some of the partnerships between the University of Wyoming and businesses in Wyoming to support research, and how does this collaboration lead to more targeted and applied research?

Mr. Coddington. Mr. Chairman, thank you for your question. Yes, as you mentioned in your introductory remarks, the School of Energy Resources was created, in part, a decade ago to help build those bridges, and it is one of the benefits of being in the State of Wyoming, where you can cross the aisle and work collaboratively with partners and industry.

Under most of the Federal grants that we are implementing, there is, in fact, a mandated cost-share requirement that requires us to reach out for State dollars or private sector dollars on many of these projects.

With respect to our carbon capture and storage projects, we are privileged to be teamed with two major utilities in the State of Wyoming, other oil and gas partners, drilling companies and the like; and, indeed, I cannot think of a major project we have underway that does not have the participation and some role, typically major, of a private sector partner.

We do very much have an economic focus. All research and development is good, but at the end of the day it has to be economic and work towards the public good, so you need that private sector input, and we are very sensitive to that.

So, to conclude, UW is very proud of our collaborations with various entities in the State, including the private sector, and I don't think we could do that work without them. Thank you.

Senator Barrasso. And, Mr. Eisenberg, at a hearing held in September, David Greeson was here from the NRG Energy, and he explained the burdens that New Source Review posed to the Petra Nova carbon capture project. He spoke how New Source Review is a barrier because of the uncertainty the current regulatory framework presents to business.

In your testimony today, you explained that New Source Review discourages emissions reduction projects in the manufacturing sector, as well as in the power generation sector. So, could you possibly elaborate a little bit further with maybe

some specific examples?

Mr. Eisenberg. Absolutely. Thank you. A lot of the same problems that the utility sector experiences on New Source Review pervade the same sort of upgrades that we are trying to do in the manufacturing sector. Most manufacturers have an industrial boiler in place, either steam turbine or a gas turbine, to produce energy and heat. The manufacturers of the control technologies for those believe that there is a technology out there that are a series of upgrades that could improve the efficiency by two and a half percent that would result in about six and a half percent reductions per megawatt hour of greenhouse gases. The majority of their customers aren't doing it because this would trigger New Source Review and it would sort of start the saga.

Another good example is if a pulp mill is taking down two older, let's say coal-fired boilers, and then to replace them with one gas-fired boiler, when you are considering that, the only thing you consider going into NSR is that you are building a new gas-fired boiler, not that you are having a net reduction of, let's say, 200 tons per year of NO_x, or whatever the pollutant that you are trying to control is. So, that factors very heavily into the decision as to whether or not you are going to take on this project.

There is a lot of opportunity here. Obviously, there are

plenty of manufacturers making control technologies across the board for these pollutants. And I am not suggesting that NSR shouldn't happen; it is just let's figure out a way to actually let it enable some of these efficiency upgrades. That is really all we are looking for.

Senator Barrasso. Mr. Coddington, the University of Wyoming supports this unique public-private partnership known as the Integrated Test Center that we talked about. It is going to be one of the first research facilities in the world located at an operating coal-fired power plant. The ITC researchers are going to study how to use the excess carbon dioxide that is captured at the plant and turn it into a valuable product.

Can you talk a little bit about how this research is going to support further reductions in carbon emissions?

Mr. Coddington. Yes, Mr. Chairman. So, as you indicated, the Integrated Test Center should start operations in January of 2018. It is the only center of its type in the United States. It will upscale increase from the good work that is currently being done at the National Carbon Capture Center. The researchers there, including the first tenants, which are the NRG COSIA Carbon XPRIZE, will be looking at ways to more efficiently both capture carbon dioxide emissions from a coal-fired power plant, that being Dry Fork Station, and they will also be conducting research on how to make beneficial use of

that carbon dioxide. Indeed, making maximum use and economic use of the CO2 is one of the major purposes of the Carbon XPRIZE. So, the ITC, by design and definition, is fulfilling the mission of pursuing economic technologies to reduce carbon dioxide emissions from coal-fired power.

Senator Barrasso. Thank you.

Senator Carper.

Senator Carper. Thanks.

Thanks again, everyone, for joining us and for your testimony today.

As my colleagues have heard me mention, I am a native of West Virginia. My dad, coming out of high school, worked at a coal mine in Beckley for a while, before going off to World War II, and I have a strong feeling and affection for people in West Virginia, and in Wyoming, including a cabin in Wyoming, Delaware. It caused a big deal in coal, a big deal in Wyoming as certainly my native State. I have supported clean coal technology for longer than probably a bunch of the people in this room have been alive. Robert Byrd, was one of my early mentors while I was in the House and later as a Senator here.

Having said that, I was pleased to work with Ted Stevens, Diane Feinstein, and others on regulations, CAFE regulations, actually, on legislation raising for the first time in some 30 years fuel emission standards, mileage standards, fuel

efficiency standards back in 2007; and we have seen, as is always mentioned about the kind of job growth that has taken place as a result.

I think one of the most important things we do, as I said earlier, in government is create a nurturing environment for job creation, job preservation. With respect to fuel savings, efficiency savings, reductions in emissions that have flowed from the changes since the 2007 law was signed by George W. Bush has been remarkable.

The role of government in this is not just to pass laws or regulations that sort of put the meat on the bones of the laws, but we also have the opportunity to make investments in R&D, smart investments that help lead to technologies that can be commercialized and lead to these efficiencies. A second thing that we can do is have tax policy that incents people to buy energy-efficient vehicles, and we have that today. The third way that we do it is we use the government's purchasing power to help create a market for these new technologies and new products; and we need to do all of that. Plus, we have invested a whole heck of a lot of money in clean coal technology, as I think most of us know.

I am going to ask Zoe a question. One of the most important things we can do in government is, as I said, create that nurturing environment. We tried to do that in Section 143

of the FAST Act a couple of years ago, which requires the Department of Transportation to designate national electric vehicle charging hydrogen propane and natural gas fueling corridors. These proposed corridors are nominated for designation by State Department for Transportation and local entities.

I would just ask Ms. Lipman are you familiar with that provision in the FAST Act that requires and supports new transportation innovation? If so, how would you recommend that we build on it in other policies to incentivize more private sector innovation for alternative fuels and alternative fuel infrastructure?

Ms. Lipman. Thank you. I am not familiar with the details of that policy, but definitely with the broader --

Senator Carper. Go ahead.

Ms. Lipman. -- efforts to promote not only electric and other alternative vehicle charging and fueling infrastructure, but also the vehicles themselves. And I would underscore that we are really in a race for the next generation of vehicle technology worldwide. A couple decades ago people had questions about whether electric vehicles were real and whether the U.S. had what it takes to build the technologies, especially the electric powertrain, the batteries, etcetera.

Today we have manufacturers of both the components that go

into electric vehicles and into the infrastructure across the Nation; there are probably two dozen in Indiana alone, as well as all across the south, in California, in Texas. And there is rapidly growing interest not only, and I think this is something that crosses over into the electric sector as well, but in using the technology that goes into charging to also help us upgrade and make more resilient our electric grid.

So, there is a tremendous opportunity for innovation which is being deployed already. Meanwhile, nations across the world, whether in Europe or in Asia, in China, in particular, are pulling out all the stops to see that they too can lead in this rapidly growing technological field.

Senator Carper. Thanks. Hold it right there. Hold it right there. Hold it right there. I am running out of time.

My wife and I went to an Aspen Institute seminar back in August in Norway. Norway has the fifth or sixth largest gas and oil reserves in the world. They also have 40 percent of their vehicles now are powered by electricity. Forty percent are powered by electricity.

A year earlier I went to an Aspen Institute seminar in China and had the opportunity there to see the incredible investments that China is making in electric vehicles; large buses, cars, trucks, and the infrastructure to support them.

Ford and GM just announced last month that they are going

to be launching 23 new models of electric vehicles in this Country I think by 2025. This is coming. This is coming, and they are going to need to be powered somehow. They can be powered by utility powers creating electricity. It could be coal, it could be natural gas, it could be clean coal, I hope. It could be renewables as well. There is a way to do this and do this in a smart way.

Senator Barrasso. Senator Inhofe.

Senator Inhofe. Thank you, Mr. Chairman.

I have to say one thing in response. They always end up talking here about the great Paris Agreement. If there was ever a joke, that is it. You know, they have been trying for 21 years to get 192 countries, 196 countries to agree on something that they all agree on; and when I have talked to those individuals, and I have been at some of these meetings, they are there lining up to see who can get the most money out of the system. Now, this great Paris Agreement that took place, what did we commit to in our Country? President Obama said we will reduce CO2 emissions by 27 percent by 2025. Now, I was chairman of the Committee at that time. We called his own EPA and said we want you to come in and testify and tell us how you are going to cut these emissions. They refused to do it. I have never seen a time when someone in the jurisdiction of a committee refused to testify. And the reason was that they couldn't do

it.

What did other people agree to? India. India said, yeah, we will agree that if we get somewhere between \$1 trillion and \$2.5 trillion, we will start doing something about emissions.

China. China, right now, every 10 days comes out with a new coal-fired energy plant, generating plant, and they said we will continue to do that until 2025, then we will consider doing something of a reduction. When 2025 comes, no one is going to remember.

But I would just like to remind people that they have tried for 21 years and this is the best they can come up with.

Now, Mr. Eisenberg, I want to mention something. Some good things are happening right now. I mean, look at the economy. There is an article in this morning's Wall Street Journal that I want to make, Mr. Chairman, a matter of the record here. I will just quote one or two sentences here. "U.S. manufacturers have added 156,000 workers since Donald Trump was elected President in November of 2016, according to the government data. That is a clear turnaround from the loss of 16,000 jobs during the final year of Barack Obama's Administration."

I ask unanimous consent this be made a part of the record.

Senator Barrasso. Without objection.

[The referenced information follows:]

Senator Inhofe. Also, the other thing, I have personal experience in this because I was a builder and developer for 20, 25 years, and I was doing things, making the sacrifices, building, expanding the tax base, making money, losing money and all that. But the chief opponent I had, or opposition I had all that time was the Federal Government. So, I want to make this a part of the record, too.

One of the great things this President has done is all the CRAs, Congressional Review Acts, and I am proud that mine was the first one that had a signing ceremony, and that was the one where Obama had come out with a rule that said if you are competing here in oil and gas domestically, in the United States, with China or other countries, you have to give them all the information out of your playbook, putting us in a competitive disadvantage.

So, I introduced a CRA. It passed overwhelmingly and the President signed it.

And I want to make this a part of the record also, because I have some 70 rules and regulations that have caused our energy economy to start turning around.

Senator Barrasso. Without objection.

[The referenced information follows:]

Senator Inhofe. So, I just want to observe, Mr. Eisenberg, all the things that are happening right now. You know, the second and third quarter of this year, we have increased the economy by 3 percent. In the first quarter, of course, that was the previous Administration, it was 1.6 percent. And that is a huge thing. Right now we are talking about what can we do to increase the revenues that come into the United States, and one of the best ways is to increase our GDP, and that is exactly what we are doing.

So I would say, Mr. Eisenberg, there is not time for a question from you, but I would only say that good news, good things are happening right now, and I think your testimony has made that real clear.

I want to say one thing, however, Mr. Coddington, because Harold Hamm, do you know who Harold Hamm is?

Mr. Coddington. Yes, I do.

Senator Inhofe. All right. Harold Hamm, for those who don't know, is the Executive Director of the International Energy Agency, and he said yesterday, "The United States will become the undisputed global oil and gas leader for decades to come. The growth and production is unprecedented, exceeding all historic records." Harold Hamm, by the way, is from Oklahoma. He has the Continental Resources and he is even, right now, exporting oil to china, of all things.

So good things are happening and I have no questions.

Thank you, Mr. Chairman.

Senator Barrasso. Thank you, Senator Inhofe.

Senator Whitehouse.

Senator Whitehouse. Thank you.

First, Mr. Chairman, let me say I hope that the hearing becomes an encouragement for the bill that you and I have worked on, the Carbon Capture, Utilization, and Storage Act. I think that there is significant technological opportunity to be achieved in that space, but it is rather hard to achieve technological opportunity in a space in which there is no value proposition to the investor. And as long as there is no price on carbon, the corollary of that is that there is no benefit to low carbon, so it gets really hard to find a way to achieve revenues for offering a carbon capture technology. There have been some grants that have allowed experimental projects to proceed, and where you are near an oilfield, there is, like up in Saskatchewan, the ability to try to find a revenue stream from pressurizing the oilfield. But not every coal plant is located geographically near an oilfield where that revenue stream is even a possibility.

So I think we have the opportunity in this bill to at least create a window of a revenue stream to support that, and I hope we will continue to move forward with that bipartisan

legislation.

As long as we have you here, Mr. Eisenberg, could you tell me what the position is of the National Association of Manufacturers on climate change? I haven't been able to find anything on your Web site since the 2009 statement of the 80 different hurdles that any legislation or program would have to pass before you could support it, which didn't even seem consistent with one another.

Mr. Eisenberg. Absolutely.

Senator Whitehouse. Is there a current position since 2009?

Mr. Eisenberg. Absolutely.

Senator Whitehouse. What is that?

Mr. Eisenberg. And I will direct you to the part of the Web site that does state it. We believe that we should be acting on climate, period. Manufacturers are increasingly doing it, you know, across the board. Manufacturers are taking matters in their own hands because their investors are demanding it, their customers are demanding it, their employees are demanding it, and they are doing it. So we absolutely believe that we should be acting on climate change --

Senator Whitehouse. And you opposed the Clean Power Plan, correct?

Mr. Eisenberg. We did oppose the Clean Power Plan. We are

asking the EPA to replace it with a better regulation. So we are comfortable with regulation --

Senator Whitehouse. Is there an example that you have of a better regulation or is that just kind of a hypothetical better regulation out there in space?

Mr. Eisenberg. Sir, we are not the ones writing it, but, yeah, we are going to have some ideas on what that should look like. I think under 111 --

Senator Whitehouse. But you don't have a proposal?

Mr. Eisenberg. So we have not put forward our proposal yet. In some of the Clean Power Plan comments we did actually submit plenty of suggestions on how they could sort of fix that proposal. Frankly, 150 pages of suggestions. Some of them were taken; some of them were not. But, yeah, there are things you could do within the confines of 111 that I think would probably hold up under law and would be effective in reducing emissions.

Our concern on that, quite frankly, was not just the power sector, but the sort of follow-on effect, since that is a precursor to rules on the industrial sector as well.

Senator Whitehouse. I guess I would just close by saying I am glad that you are, as an organization, supporting taking action on climate change. I gather you wouldn't support that if you didn't concede that this is a real problem that America needs to address. And I gave remarks a little while ago on the

Senate Floor about some of our universities that seem to agree very strongly on this, and I pick out particularly, because their States are here represented today, the University of Wyoming and the University of West Virginia.

The University of Wyoming Center for Environmental Hydrology and Geophysics says many of the most pressing issues facing the western United States hinge on the fate and transport of water and its response to diverse disturbances, including climate change. University of Wyoming scientists publish articles on the effects of projected climate change on forest fires, sustainability. The University of Wyoming awards grants to study the effects of climate change on pollinators, on water flow, on beaver habitat, on white bark pine growth. All of this work is going on, I think, in good faith in recognizing that climate change is very serious.

In West Virginia, the Mountain Hydrology Laboratory tells us that climate change has important implications for management of freshwater resources; that the Highlands Region in the central Appalachian Mountains is expected to "wet up"; that as warmer air, which carries more moisture, leads to what West Virginia University is calling the intensification of the water cycle, which is a nice way of saying storms and floods, that laboratory warns that the implications of this intensification are immense. And, indeed, West Virginia University's climate

scientist, Professor Hessel, was recognized by West Virginia University as West Virginia University's Benedum Distinguished Scholar. So not very likely that climate change is treated as a hoax in West Virginia when the West Virginia University Benedum Distinguished Scholar teaches climate science.

Thank you very much.

Senator Barrasso. Thank you, Senator Whitehouse.

Senator Carper. Mr. Chairman, I ask for unanimous consent, if I could make a unanimous consent request, to submit for the record testimony refuting concerns mentioned about New Source Review. These concerns have been voiced for decades. As Mr. Eisenberg stated, clean investments are being made. New Source Review makes sure the overall emissions do not increase so we don't clean up our pollutants by increasing emissions of another.

Thank you.

Senator Barrasso. Without objection.

[The referenced information follows:]

Senator Barrasso. Senator Capito.

Senator Capito. Thank you, Mr. Chairman.

Thank all of you for being here today.

I am going to start with Mr. Coddington, but I am going to make a couple of comments. I am also a co-sponsor of the clean coal bipartisan effort to move forward with the technologies, bring value to that, and spur that along through a 45Q tax credit. We have great stakeholders in that participating, from environmentalists to coal companies, so I think it shows a path forward.

I would also say, in conversation about electric cars, I am all in favor and very excited about the technologies that we see. But remember they have to be powered by electricity at some point, and they have to be plugged in, and what that says to me, as a coal State representative, is you need that good baseload energy resource to be able to power electric cars.

So we can move towards emission-free on the automobile side, but we have to keep moving forward on the coal side because coal is going to be needed to power those electric cars. That is just simply going to be a fact, I think, of the future of our transportation system.

As Senator Whitehouse mentioned, West Virginia University is doing great research in this area, but we also have Longview Power Plant, which is the highest efficiency, lowest emission

plant in the Country, and they are struggling. They are struggling because the economic model here in this Country to deploy the cutting-edge emission and dual-fuel capacity and regulatory pressures has made it difficult for them.

In the meantime, the President just returned from China. We see China building super critical plants and moving forward not just with the buildout, but with the technology that it takes to build these kinds of plants. You can't build that in the United States right now in this environment, because of the expense and because of the difficulties and the headwinds that coal faces.

So I would ask Mr. Coddington where do you see the future of supercritical coal plants in this Country? Can we get there or is China going to continue to eat our lunch in this aspect?

Mr. Coddington. Senator Capito, I do have great confidence in ultra-supercritical combustion technologies. I actually think if the regulatory environment is right, that you may see some of those plants start to come in the United States. In conjunction with our colleagues at West Virginia University and University of Kentucky, we are actually doing a lot of clean coal projects both in China and in the United States under the U.S.-China Clean Energy Research Center. So I am very optimistic about that technology. When you look at pathways forward for clean coal, certainly the more efficient combustion

of it would have to rank among some of the most optimistic technologies that you could employ at scale. I think one of the main issues in the United States is competition between coal and gas, so there are economic considerations there that can't be overlooked. But I am quite optimistic about ultra-supercritical coal.

Senator Capito. Well, you kind of threw a big if in there: if the regulatory environment is suitable. How would you describe it at this point in time right now? Are we suitable for the development of that; are we moving towards that or are we moving away from it?

Mr. Coddington. Senator Capito, again, I am not a particular expert in this field, but my impression is, under the Clean Power Plan and the Section 111(b) rules, that there was a preference towards carbon capture and storage, if you will, as opposed to maybe the deployment of ultra-supercritical technologies, and I say that as a carbon capture and storage fan. I was looking for incentives for carbon capture and storage in funding. But I would think in an appropriate policy and regulatory environment that there should not be a reason why those plants could not be encouraged to be built, as long as the economics otherwise penciled in light of the market prices for shale gas.

Senator Capito. Thank you.

Mr. Eisenberg, we have talked a lot about carbon and carbon emissions. We have had several hearings on ozone and the ozone-related regulations, and some of the difficulties that some areas of our Country are having to meet a standard before they have met the standard before.

What are your manufacturers telling you about trying to meet the standards here? I would just like to hear your comments on that.

Mr. Eisenberg. Thank you, and thank you for your leadership in trying to address this issue legislatively. We still need relief. We actually went out to our members and asked for input, heading into this year, on what their biggest regulatory concerns were, and ozone is still at the top. They are struggling with having to implement this regulation and comply with it. It gets to the margins of technologies that they frankly just don't know how to deploy.

One of the charts I put in here, actually, a couple of the charts I put in my testimony are on NOx and VOCs, and you can see, on NOx, for instance, we are about 15 to 25 percent of all the total NOx emissions that come from the manufacturing sector. Yet, that regulation basically requires all of the relief to come from us. So you kind of get a sense of why we are so frustrated here. We have done a lot already. We are running out of things to do and we are still feeling the pain of this

regulation and could really use relief, and thank you for all the work on it.

Senator Capito. Thank you very much.

Senator Barrasso. Thank you, Senator Capito.

Senator Boozman.

Senator Boozman. Thank you, Mr. Chairman.

Mr. Eisenberg, a common complaint I hear from industry in Arkansas about the previous Administration, really, I think, Administrations in general, is the gotcha attitude from Federal agencies. Instead of working hand-in-hand with the industry to develop regulations that help the environment and foster economic growth, many felt that they didn't have a place at the table. Then, when regulations and unfunded mandates were released, industry were expected to hit thresholds that were impossible to reach. This usually ended with the Federal Government stifling economic growth, while providing few, if any, environmental benefits. Further, many regulations developed during the previous Administration were litigated, wasting the Federal Government's time and money.

In your opinion, does an open and transparent dialogue with industry help the Federal Government develop sound regulations? More specifically, can this lead to smoother implementation?

Mr. Eisenberg. So, thank you for that.

Senator Boozman. Really important.

Mr. Eisenberg. I strongly believe that there needs to be improved communication and trust between the business community, the regulated community, which is essentially manufacturing, and the Federal Government. And you can see it in the vehicle space that my colleague from the BlueGreen Alliance spent a lot of time talking about.

For some reason, we are able to do it in the vehicle sector, where the agency got together with the equipment manufacturers, the tier 1 suppliers, and figured out a path forward that was aggressive, it worked, and everybody was able to kind of live with it and create jobs. You see it in the trucking space; you see it in the aviation space.

We weren't able to do that on a lot of these sort of core environmental air pollution issues in the stationary source side, the power plant side, the manufacturing plant side. Our hope is that we can get there. There are some programs that EPA is putting in place. They resurrected something called the Smart Sectors Program where there are dedicated employees who are working with each individual sector of the manufacturing economy and trying to foster better communication, better trust; and I do think that is the way to get there.

We all want the same thing here. We are all trying to keep those trend lines on emissions going straight down. And I think there is a way to do it right and a way to not do it right, and

hopefully we are headed towards a better path.

Senator Boozman. Ms. Lipman, do you want to comment?

Ms. Lipman. I would actually second a lot of that in the sense that I do think the vehicle sector provides an example of the importance of engaging all stakeholders who have a key stake in the outcome of regulations, both in the regulated industry, as well as labor, environmental interests, community interests, etcetera. And I think there is tremendous potential to get to solutions that work for everyone.

I think one thing that we have talked about here is the tremendous innovation happening. I do think we need to ensure that we have the leading standards and the sort of certainty and vision for companies to be able to make the investments to actually deploy some of these technologies, whether it is CCS or nuclear or advanced wind, you name it. I think in the electric sector we have seen a situation where all of those require a long-term sense of where are we going in order for the investments to flow to deployment. So, whether we are looking at Paris or whether we are looking at economy-wide solutions, climate change, we need to retain a signal and a leadership or we are not going to see these variety of technologies across. And we would agree that the span, the full range of energy and transportation technologies are solutions, but we need a shared commitment and clear regulatory pathway to get there.

Senator Boozman. Thank you.

Mr. Coddington, about 40 percent of Arkansas's electricity is sourced from coal. The State's legislature and the Arkansas Oil and Gas Commission have coordinated to set up a permitting process for enhanced oil recovery injection wells. The oil and natural gas production renaissance of the last 10 years has occurred on public and private lands, with the Federal Government slow to adapt to new technologies. It seems that States are leading on enhanced oil recovery as well.

What can we, as Federal policymakers, do to help facilitate the deployment of carbon capture and enhanced oil recovery technologies?

Mr. Coddington. Senator Boozman, thank you for your question. First, I would like to commend the Committee for its work on 45Q, which has bipartisan support. Certainly, anything that can be done to incentivize the capture of carbon dioxide and utilizing it in enhanced oil recovery, or injecting it for deep saline storage, is to be commended, and we are very thankful for that.

If you look at the existing markets for CO₂, the biggest one is enhanced oil recovery. Largely, that is a matter of State regulation. There are some issues with respect to the underground injection control code under the Safe Drinking Water Act regarding the regulatory status of carbon dioxide that is

stored. So, for example, under current law, if I purchase carbon dioxide and inject it for enhanced oil recovery, and then it has to be stored, I am at risk of being tossed into a different regulatory program that could be problematic for me. So I would recommend perhaps taking a look at the underground injection control program and how that might work from the point of view of enhanced oil recovery. But, largely, that is a matter of State regulation, and the State of Arkansas is to be commended for its work that it is doing in this area.

Thank you.

Senator Boozman. Thank you.

Senator Barrasso. Thank you, Senator Boozman.

Before turning to Senator Carper for a second round of questions, I ask unanimous consent to insert into the record a paper on New Source Review. This is a whitepaper explaining the barriers that New Source Review poses to fossil fuel-fired power plants that make efficiency improvements difficult. The paper was prepared by the Carbon Utilization Research Council.

And also unanimous consent to --

Senator Carper. I object. Not really.

Senator Barrasso. Hearing no objections, ask unanimous consent to place into the record written testimony by Cloud Peak Energy in support of innovative policies to reduce emissions and provide regulatory certainty. Cloud Peak is headquartered in

Wyoming; it is one of the largest U.S. coal producers.

[The referenced information follows:]

Senator Barrasso. Senator Carper.

Senator Carper. I am counting the number of times you say Wyoming today. We have a little town just south of Dover called Camden Wyoming. I go there a lot. I go through it a lot. So I am not in Camden Wyoming as much as he is in Wyoming.

Senator Barrasso. We can start with the Neil Young song, the Emperor of Wyoming.

Senator Carper. There you go. We sure could.

I want to go back to you for a question, Ms. Lipman. The Administration, this current Administration here in Washington signaled that it is interested in weakening heavy-duty and light-duty vehicle regulations, as you know. If we do that, what kind of effects is that likely to have on innovation and job creation?

Ms. Lipman. My testimony and my written testimony is a little more detail. We have told a very optimistic story about the tremendous progress and the recovery in the auto sector and in the supply chain that we have seen domestically as a result of strong, certain, long-term standards. Unfortunately, the converse is also true. If we were to roll back standards, or if we were to even introduce great uncertainty as to the future of the standards, we put jobs at risk, we put innovation at risk, and particularly we put at risk those investments that companies are thinking about making in the near term.

Our tier 1 suppliers, and I recently heard a supplier association talk to this, they operate worldwide, and they are looking at where will be the place that we are deploying this next generation of technology. Where should be put our R&D? Where should be put the manufacturing that goes with it? And if folks are not convinced that we are moving forward, we risk losing those investments.

Senator Carper. Thanks.

There has been an ongoing discussion around the targets for energy-efficient vehicles and that we are on a glide path between 2025 to a very rigorous target, and then there is nothing more in terms of target beyond 2025. In conversation with the auto industry, environmental folks, others about providing some flexibility between 2025, but then targeting for more rigorous target effective in 2030. That gives the industry some flexibility near-term, but it gives them the certainty of something long-term to focus on.

I was mentioning to the Chairman, I was present at the Detroit Auto Show 10 years ago when the Chevrolet Volt was launched. It got about 35 miles per charge. This year, when the Chevrolet Volt was launched, it gets 240 miles per charge. And it is only going to get better. Batteries only get better, and that is why we are seeing Ford and GM and a bunch of other companies here in this Country and around the world saying we

are going to do this, we are going to do this.

How important is it to have certainty beyond 2025 in this regard?

Ms. Lipman. At the risk of repeating myself and my testimony --

Senator Carper. Just repeat yourself briefly.

Ms. Lipman. Yes. Strong, long-term certain standards are critical, and the more that industry can look out, can make those plans, again, not just the automakers, but the suppliers, the better. And I think to the extent that it is possible to extend that trajectory, the more we are likely to have people willing to make the deep commitments and long-term commitments to the next generation of technology in America.

Senator Carper. Okay. Thank you.

Ross, just a quick comment, please, on this.

Mr. Eisenberg. So, we still have a mid-term review that we have to complete for the current set. This is an industry that has never really shied away from long-term standards. I just hope that when we get there it is a data-driven process and it gets to a place where everybody wins. We were able to see that the first round and, frankly, a little bit of the second round, so hopefully it all works out well in the end.

Senator Carper. Okay. Thank you.

Mr. Eisenberg. An inclusive process is a good one.

Senator Carper. Thanks very much.

My last question for the panel is how do we make clean air a bipartisan issue again? I thought this was going to be a great hearing. It has been a good hearing. I have been excited about this hearing for weeks. But how do we make this a bipartisan issue again? What are some of the suggestions that you would give us that we can maybe work across the aisle to lift up communities that are being left behind, like my native State of West Virginia, while continuing our clean energy global leadership?

Kipp, do you want to lead us off?

Mr. Coddington. Yes. Thank you, Senator Carper. I actually view this as a bipartisan issue, and I am coming at it from the point of view of Federal support for research and development. And certainly sitting in the States outside of the Beltway, I think there is support for the advancement of these technologies and the ongoing critical role of the Federal Government. So call me politically naive, but I actually view these issues as bipartisan at the end of the day, and we are very thankful for the ongoing Federal support that we have received.

Thank you.

Senator Barrasso. If I could just follow up on that. Mr. Coddington, this will be my last question as well, because I was

in the --

Senator Carper. I was asking the whole panel.

Senator Barrasso. Oh, I apologize.

Senator Carper. Same question. How do we make clean air a bipartisan issue again? Any suggestions of how we can move in that direction?

Mr. Eisenberg. So, I have been asking the same question. I testified before the Energy and Commerce Committee back in February and said, hey, it is time to really put our hands together and figure out how to modernize some of these policies, like you guys did with TSCA. I mean, this is begging for a similar approach. But, to your point, there has to be a lot of work done to build trust and make it a bipartisan issue.

Our hope is that maybe by building around some of these areas that get in the way of clean energy and efficiency gains we can start to build some of that trust up and some of those working relationships up. It is not, in our view, a good versus evil kind of thing; we are all driving towards the same end zone here. We just need to sort of get passed some of the past fights that we have had and work towards something positive.

Senator Carper. All right, thanks.

Zoe?

Ms. Lipman. We are finally coming together at least on the panel.

Senator Carper. Seems like kumbaya moment.

Ms. Lipman. We also view this as a tremendous opportunity to achieve health and environmental gains that we know are supported by both sides of the public, if not both sides of the aisle. But also there is a tremendous opportunity to both engage all the stakeholders, as you mentioned, Ross. I think this is critical and it can be done through a variety of processes. We do it at a State level and, ourselves, have seen tremendous opportunity. And the second is to continue to connect this to rebuilding manufacturing and good jobs in America. And there is tremendous opportunity to bring folks together around how does meeting our climate and energy goals help drive forward an agenda to rebuild America's economy, which I think we all share.

Senator Carper. Thanks.

Mr. Chairman, just a closing thought, if I could. This kind of conversation with you and me. I think Shelley put her finger on something, and she represents a State that has great dependence still on coal and also on natural gas. Certainly, Wyoming does. We are moving toward electric powered vehicles. If I had any question about that a year or two ago, I don't anymore. And with the announcements coming out of Ford and GM, it is clear that that is where we are headed here in this Country, too.

And her point, and it is a very good point, is how are we going to generate the electricity to fuel those vehicles. And the source of the generation of that electricity could be coal. It has to be really clean coal. I think we have the technology. We are moving in that direction. After long, long ramp-up, we are moving in that direction to actually be able to do that a lot better. Certainly, natural gas and renewables. But, at the end of the day, how we generate electricity in a clean way and put those vehicles on the road using virtually no petroleum for a lot of those vehicles, that is going to do wonders for the quality of our air, and we just need to lead the charge. We have to be leading the charge in technology to get that done; not only on the clean coal side, but also in the generation of storage for batteries. If we do that, we will create just a truckload of jobs.

Thank you all.

Senator Barrasso. Thank you, Senator Carper.

A final for Mr. Coddington. I am delighted I was in the State Senate in Wyoming, in the legislature, at the time that the School of Energy Resources was brought into play, and it is wonderful to see here we are, a decade or so later, with significant successes.

I wanted to mention to you that the University of Wyoming is committed to research that seeks collaborative solutions to

energy and environmental needs.

My final question is could you just explain how the approach at the University of Wyoming School of Energy Resources adopts is unique and how other States might be able to benefit from a similar collaborative approach?

Mr. Coddington. Absolutely. Thank you, Mr. Chairman. So, the School of Energy Resources is separately funded by the University of Wyoming legislature and it has this bridge-building applied energy, applied research role, and the goal of it is to ensure that academic research, in this instance that has an energy focus, actually has a perceived outcome that is going to benefit all relevant stakeholders and taxpayers in the State of Wyoming.

So we do work collaboratively with colleagues on campus. We work a lot with industry partners. We have a close working relationship with the Wyoming legislature. So we are supporting academic research, but we always have in the back of our mind what is the potential return for the taxpayer and those who are funding universities such as ours. So I think it has been a successful model and it is a privilege to be there, and thank you for your support of it, Mr. Chairman.

Senator Barrasso. Well, thank you very much.

Thank you to all three of our witnesses. I thought they did a wonderful job in discussing this topic.

Senator Carper. He always says that.

[Laughter.]

Senator Carper. No, he doesn't. I always say that.

Senator Barrasso. He always says that.

I would remind the members that other members of the Committee may be submitting written questions for the record, so the hearing will remain open for two weeks. I want to thank you again for being here, for your testimony on this important issue.

The hearing is adjourned.

[Whereupon, at 11:16 a.m. the committee was adjourned.]